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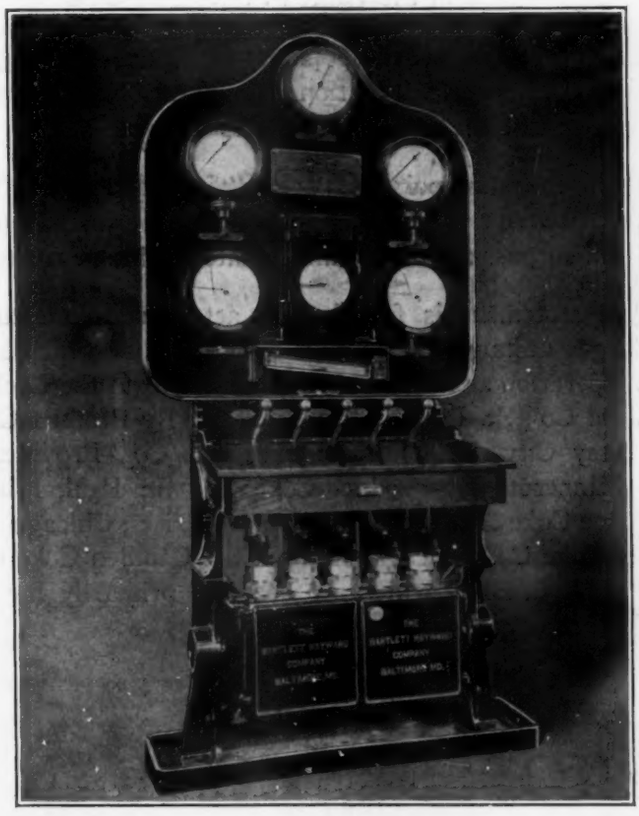
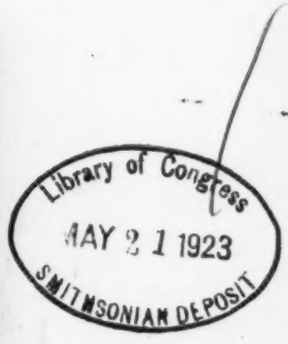
Hydraulic Control of Water Gas Sets





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This advantage, together with the gauge board in plain view during operation, allows of easy control of all valves at a considerable distance. The operator is able to maintain his position well away from the heat of the apparatus.

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Koppers Coal Gas Plants

There are now under construction two plants of our small gas oven type, located at Battle Creek, Mich., and Zilwaukee, Mich.

Into these plants will go the knowledge and experience gained in building virtually 90 per cent of all the by-product coke and gas ovens in the United States and Canada.

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This statement is founded on actual results secured from larger units which we have built, some of which have been in operation as long as ten years, such as at the Laclede Gas Light Co., St. Louis, Mo.; Seaboard By-Product Coke Co., Jersey City, N. J.; Providence Gas Co., Providence, R. I.; Minnesota By-Product Coke Co., St. Paul, Minn.; Milwaukee Coke & Gas Co., Milwaukee, Wisc.; Chicago By-Product Coke Co., Chicago, Ill., and the Camden Coke Co., Camden, N. J., all of which are operated primarily for the manufacture of gas.

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American Gas Journal

SIXTY-THIRD YEAR

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The Development of the Gas Industry

SUGGESTIONS THAT MAY SEEM RADICAL

By W. D. Wilcox, East Idaho Gas Co., Idaho Falls, Ida.

A choice of two policies is open to the management of the ordinarily situated gas company. It may seek to develop the use of gas by giving the greatest value possible, or it may charge a rate for gas as high as the regulating body will permit and undertake to supply only those uses of gas in which a value in convenience is obtained justifying this high rate. In a community where this policy is followed, we may expect to find a relatively small consumption per meter and only a small annual increase in the output, additional sales through the supply of new customers being offset by gradual substitution of other means of service.

The public is under no obligation to use gas, or, using it, to consume any particular volume. Every useful result obtained by using it can be accomplished by one or more alternative means. In lighting, it must compete with electricity, kerosene and acetylene gas; in the production of power, with the steam engine or water power distributed as electricity, and with internal combustion engines using gasoline, heavy oil, or producer gas; in heating, with electric current, oil and a variety of solid fuels.

Where one means of service is in use, there is a tendency to continue it, not merely because of the expense of installing new equipment, but because of what may be called the inertia of habit. Where the use of gas has become established, it will be continued in a greater or less degree in competition with alternative means, which, everything considered, might be found more advantageous. Where the gas utility is relatively a new comer, the advantages which it offers in the way of value in service for a dollar must be enough greater than those obtained through alternative means to justify the cost of installing gas. The high value uses of gas are for lighting when the house is not wired for electricity, and cooking, particularly in hot weather, when the extra heat given off by a coal range is a detriment rather than an advantage.

Where the rate for gas is relatively high, the tendency for the lighting to be taken over by electricity is hastened. The cooking output is cut into in the case of the well-to-do by the electric range, and with many in modest circumstances, living in stove-heated houses, the consumption of gas is limited by the use of a coal range for much of the year, with a gas plate for hot weather. Electricity is not the most economical means of cooking when compared with gas, but where gas is high in cost and a cooking rate for electricity is made to create employment for surplus generating capacity, without including interest and depreciation on plant in figuring its cost, it may be actually more economical to the individual user.

The policy of high gas rates may, from the standpoint of the management, be the wiser choice. When the demand has already been built up to very nearly the generating and storage capacity of the plant, accessions of new business will balance the loss to competitive means of service, and a better return earned upon the investment than would be possible at lower rates. A reduction in rates would bring about an increased demand; this in turn would compel additions to the plant. To provide this, additional capital must be found. This may not be possible. Where the earnings of the plant fail to show a good margin of safety above what is necessary to pay interest on the outstanding bonded indebtedness, more money cannot be borrowed, and with rather small and intermittent dividend payments, new stock will be hard to sell.

Limits Usefulness of Gas Service

But such a policy must be regarded as limiting the usefulness of gas to the community and a disadvantage to the gas industry as a whole.

Much of the handicap under which gas companies are operating is due to an unwise and uneconomic system of regulation.

It is submitted that when the public through its authorized agencies, federal, state and municipal, undertakes to regulate and control any industry or public utility, the purpose to be accomplished should be to obtain for the public the maximum value in service. The success of public control must be judged by its effectiveness in securing this result. If it is not effective in the highest degree, a reason exists for changing the policy followed.

As will be shown later on in this discussion, the advantages gained by the public through an increased use of gas are three-fold and may be divided into three groups.

1. Those benefits enjoyed by the user of gas or the members of his immediate household.
2. Benefits which are shared by the community.
3. Benefits so widely distributed that they can best be described as social, extending beyond the confines of any political division over the entire field in which commodities are exchanged.

The advantages of a more extended use of gas in industry, as a means of saving labor, increasing the product and contributing by the readier control of temperature to more dependable results in production is receiving very widely extended recognition, as evidenced by the continued very substantial increase in its consumption within this field.

The same can be said of its use as a means of space heating. It is not hard to realize how fine it would be from an individual point of view if we could use gas in place of the furnace or hot water plant in which bituminous coal is burned. The soft coal furnace requires frequent attention. It is hard to so regulate as to maintain a uniform temperature. Its operation entails annoyance and damage from smoke, soot, dust and ashes.

Gas Convenience Receiving Recognition

The gas radiant fire, gas-steam radiator or the gas-fired boiler afford very great gains in ease of operation and temperature control and in freedom from smoke and dirt. The gas heated boiler, in which the volume of gas burned is regulated by a thermostat controlled in turn by a thermometer in the living room, insures the maintenance of a uniform temperature, with the least trouble in operation. It is an ideal system, the use of which is bound to grow. In this day, janitor service is high in cost and domestic servants are almost an extinct species, so far as a majority of homes are concerned. In the small apartment or individual residence, the labor cost of caring for the heating plant is much more than it once was. In most families having this work done by servants is impractical, and the rather unpleasant task of "tending furnace" falls upon the head of the family or his wife.

Gas rates have increased during the last seven years as a necessary result of the increased cost of labor and materials, but this increase is rather more apparent than real. We could quite as justly say that the general purchasing power of the dollar has diminished and that gas rates have been adjusted to partially meet the lower value of the dollars given in payment. As compared with solid fuels, gas is much cheaper than it has been at any time in the past. This fact is at the foundation of the very great increase in the volume used which has taken place during this period. A generation ago the writer put the winter's supply of anthracite in the basement of his home in Chicago at a cost of $5 per ton. Gas was then $1.25 per thousand cubic feet. This year anthracite coal has cost $17.85 a ton. Gas costs one dollar per thousand cubic feet. At these prices, assuming efficiencies in burning these fuels and transporting the heat to where it is wanted close to the average actually realized, it is a debatable question which means of heating will require the greater outlay. With modern gas burning appliances there is a clear gain in more uniform temperature and a reduction in the labor of attendance. Change to gas is delayed only by the expense of replacing the existing heating plants and by some doubt as to the permanence of the present high cost of anthracite.

The supply of anthracite is relatively limited. The deposits are being rapidly depleted, involving an increase both in the royalties per ton paid by the mining companies and through the remaining supply being as a whole less readily accessible, an increase in the labor cost of putting it on the cars. It seems quite certain that the cost to the consumer will continue to rise. The effect of the coal strike will pass and the price be lower than during the past winter, a resort to some other form of fuel will ultimately be necessary. Bituminous coal is the most available substitute, but any extension of its use in the raw state must be regarded as a public misfortune.

In order that there be a rapid extension in the use of gas in industry and for space heating, the advantage to the user must be sufficient to overcome the inertia of habit and to repay the cost of displacing or modifying existing heating plants and installing modern gas heating appliances. In many homes and shops in communities most favorably situated as regards the rate charged for gas, and in a very large number of our cities, where rates are relatively high, this advantage cannot be demonstrated except by giving a money value to convenience greater than most are willing to allow. Before gas can become the universal fuel, the cost must be reduced. But, in order that there be a supply of gas for those who desire to use it in larger volume, there must be such a profit to the utility as will make it possible to secure the capital needed to increase gas-making and distribution capacity. No reduction in rates is possible except gas be made more cheaply either by a reduction in operating costs or a lower purchase price of the materials from which gas is made. In many communities the profits of the gas company must in some way be increased before any considerable extension in the existing plant capacity will be possible.

Gas Offers Community Advantages

Where gas delivered through pipes laid under the surface takes the place of solid fuel, there are community advantages in the aggregate quite considerable. The burden upon the streets of wagons delivering coal is lessened; the expense of hauling away ashes, now borne by the municipality, is reduced.

When soft coal is burned under the most favorable conditions practical in a residence or small apartment, firing periods are infrequent, charges of fuel relatively large, and combustion is incomplete. A very considerable proportion of the volatiles in the coal are carried into the air as carbon monoxide, soot and tar. These, with the sulphide dioxide gas from the burning of the sulphur in the coal, cause a very considerable property damage estimated for many of our large cities at a per capita very closely approaching the per capita expenditures for the fuel

so that the actual expense to the community is doubled. By reason of the property damage being general, it may be said that the community pays half of the individual user's coal bill.

The Smoke Nuisance

Those who live in a community where the air is polluted by smoke suffer personal discomfort, loss of physical vigor and in many cases, loss of health. Going away for a few weeks on a vacation and breathing the pure air of the woods or the seashore, they come back feeling fine, only to be pulled down again within a very brief period by the breathing of contaminated air.

It is interesting to note that the first reaction to the use of soft coal as fuel, in the City of London, was a law making it a crime to burn coal while Parliament was in session. We burn it in many communities because it is the only available means of supplying heat and power in carrying on industry, and of heating our homes. We all contribute more or less to the prevailing smoke pollution. We stop only the most aggravated offenses against the public comfort and health.

When soft coal is burned the organic nitrogen content is almost entirely returned to the air as nitrogen gas of no value. When it is gasified a large proportion may be recovered as ammonia sulphate, a fertilizer which affords the most dependable means of restoring nitrogen to the soil and increasing the food production per acre. If we consider the increasing need of food to supply the growing population of the world, the supply of organic nitrogen must be recognized as a problem of world-wide importance.

When soft coal is burned under usual conditions, a large part of the volatiles escape into the air, becoming liabilities instead of assets. When the coal is carbonized, these volatiles may be recovered as tar of greater value for use in the arts than as fuel. The light oils afford a supplemental source of motor spirit, and the raw material for dyes, explosives and pharmaceutical preparations, the middle fraction, wood preservatives, disinfectants and flotation oil. The heavy tar is a protective coating for iron and steel, and a most efficient roofing and road surfacing material. The residue of fixed carbon or coke supplies a smokeless fuel closely comparable in merit to anthracite coal. The time may come when the sulphur of the coal will take the place of sulphuric acid in fixing the ammonia gas as sulphate.

By-Products.

With a greatly increased make of gas, incident to an increased use, these by-products of ammonia and tar will be produced in much greater quantity and may be expected to sell at a lower price. There is possible a very great extension of their use to which a lower price would no doubt contribute, but with a diminished return from residuals the proportion of the total cost to be recovered from the gas must be increased. A lower rate for gas through increased returns from the residuals cannot be expected. The benefit of the increased quantity of these useful products made will go to the ultimate consumers.

A ton of coal converted into gas does more useful work than when burned as raw fuel. Less coal is consumed. Gasification means conservation of a non-reproducible resource; and over a period of years this constitutes a great public advantage.

It may be noted that the man who changes from the use of coal to gas in his factory or home must bear all the cost of changing equipment and of quite probably increased fuel bills. He must recoup this increased expense from the benefits in group 1. The benefits in group 2 (community benefits) in reduction of smoke, and the improvement in the comfort and health of the community, are so widely shared that his portion of that resulting from the individual change is a small matter. The benefits in group 3 are even more widely diffused, so that he can hardly consider them at all in determining his action.

More than once it has been seriously proposed that the burning of soft coal in the crude state be prohibited and that gasification be made compulsory. These proposals have been made by men exceptionally well informed. We must recognize the practical obstacles in the way of such legislation, no matter how unanswerable the arguments put forward to support the proposal. But it is clear that organized efforts to encourage and extend the use of gas would be fruitful of good results. Both the Federal and local governments should be aware of this and active within the limits of what is practicable. This unfortunately is not the fact. The well-informed men in the U. S. Bureau of Mines have from time to time sent out bulletins in which the advantages of gas are well set forth. The Government pays the salaries of these men and for printing the bulletins, and then, by its taxing policy, penalizes the use of gas. It is followed in this action by every minor taxing body. When you buy a ton of coal, you pay in the price as a proportionate share of the taxes levied upon the coal company that dug the coal, the railroad which hauled it and the retail dealer who distributed it, around $2 per ton. The amount per ton actually paid varies over a considerable range, and it is hard to precisely determine an average, but the amount set down is believed to approximate the fact. If this ton of coal is completely gasified and sent from a central plant through pipes laid in the street, you pay an additional tax of close to $5 per ton. This additional tax is again a variable, but call to mind that the People's Gas Light Coke Company of Chicago, for example, paid last year in direct taxes $2,001,894.55, as against dividends at 5 per cent of $1,924,980, and that there were further large payments made under the income tax law by the owners of the company stocks and bonds, and the estimate is clearly within reason.

The Tax Question

It is suggested here that every company giving service of so public a character as to justify rate regulation by the public should be as free of taxation either upon its tangible property or upon the securities which it issues, as are the municipal and other law created bodies rendering similar service. Under the system of rate regulation which is now

practically universal, the higher interest which must be paid to obtain capital as compared with the rate paid by municipal corporations upon their tax-exempt bonds is considered in fixing a fair rate of return, and all direct taxes are included in the operating cost, in determining the rate which the user of the utility service must be required to pay. There is no escape from this. The public pays and the effect of this heavy taxation, higher quite generally, in the case of utilities than is the fact with respect to individually owned property, is by increasing the cost of gas, to greatly limit the extent of the field in which it can be used with economic advantage to the consumer. While exemption from taxation can be urged on behalf of all regulated public utilities, the tremendous benefits resulting from a much greater use of gas embraced in groups 2 and 3 are such as to make the granting of such an exemption to gas companies of special public advantage.

The Federal and State governments are today appropriating vast sums for the building of roads. These expenditures are justified by the fact that the roads will be used to a considerable extent by people who do not live in the local community through which the road runs.

Laws have been passed exempting from taxation bonds sold to obtain money to be loaned to the owners of farming land or to carry on food producing activities. These laws are justified to the public by the general need of food and the advantage of a supply obtained at reasonable cost.

Protective tariffs have for many years existed under all administrations and under them our basic manufacturing industries have become tremendously developed and profitable to their owners.

Legislation to Encourage Use of Gas

With these precedents before us, it does not seem preposterous to suggest legislation definitely framed to encourage the use of gas by giving to the consumer in some way a bonus which will repay a part of the community and social benefits which will, when he changes from raw coal to gas, help to offset the increased expense assumed by the user.

Attention may be called to the fact that in the case of tax-exempt farm loans or tariff-protected industries, no machinery exists for regulating or limiting the profits of those benefited. The land owner who can borrow at 6 per cent, when otherwise he would be compelled to pay 8 per cent, can sell his land at an advance of from 25 to 50 per cent above what the purchaser could afford to pay subject to an 8 per cent mortgage. The manufacturer charges what the public will pay. The purpose of the tariff is to enable him to charge a higher price for his product, otherwise the tariff would not be protective.

In the case of gas utilities, almost universally, there is a well-established system of rate regulation which compels the utility to pass on to the public every advantage gained through improved methods, lower cost of materials, lower wages, or an increased volume of sales. There may be some "lag" between the time that better earnings are realized and their appropriation by the public. There ought to be some advantage to the utility in order that there be a motive for progress, and this interval of increased earnings must be regarded not merely as quite just, but a positive public good in its final consequences. Where the public are asked to change the economic conditions under which the utility operates, it can require as a condition precedent such a reduction in rates as will preserve to it all the advantage of the change.

It is rather unfortunate that the first qualification for public office is ability to be elected. This calls for qualities quite different from those required in doing the work of the position. It has seemed to the writer at times that in selecting our public servants we were no more sensible than a farmer who having a field to plow, chose the horses which were to do the work by conducting a horse race.

The necessity of recurrent elections forces upon men who aspire to a public career the wisdom of acquiescing in existing opinion and tempts them to appeal to existing prejudices. Attacking corporations on the stump has sent many a man to our legislative halls. In every municipality where the use of gas has become general there is quite as general a desire for lower gas rates. The candidate for municipal office or the occupant who seeks to continue finds it to his political advantage to advocate lower rates or to strongly oppose any proposal for an increase. These men are seldom in a position to suggest any improvement in conditions by which lower rates will be made possible. They demand lower rates at the expense of dividends to the shareholders of the company. Protracted litigation, which burdens both the taxpayers and the company with legal expenses and expert fees, are meat and drink to the political group. The legal friends of the group in control obtain lucrative employment and, if successful, achieve a desirable position in the community. They can claim, and are quite generally given, credit for having saved large sums to the consumers of gas. Proposals for increasing the taxation of public utilities find a place in most party platforms. The people do not realize that every dollar of increased tax must as an economic necessity be added to the cost of the service rendered and paid by the users and that in the case of the gas utility in particular, these taxes are a penalty upon progress as unwise and illogical as the old English tax upon windows.

The time was when the gas industry did little to influence public opinion in its favor or inform the public concerning the conditions under which the making of gas is carried on. It rendered a useful service at a constantly lowered cost. The public liked gas, but lambasted the gas company. It was a target for the attacks of many who were uninformed and because of no defense being made to these attacks, the public accepted the adverse statements as true and developed sentiments which were antagonistic.

Public Relations More Pleasant

This situation has greatly improved. Public relations are more pleasant, public opinion more friendly, and as a result there is an increased opportunity for service.

(Continued on Page 431)

Practical Suggestions for Rate Cases*

PREPARATION FOR PRESENTATION TO COMMISSION

By S. E. Linton, Vice-President and General Manager, Nashville Gas and Heating Co., Nashville, Tenn.

From time to time during the past few years several very excellent articles have appeared in our trades and association publications on the subject of the "Preparation and Presentation of Rate Cases Before Commissions," all of which articles have been most interesting, but have, in the main, dealt mostly with the scientific and theoretical ways and methods in which such rate cases should be prepared, developed and presented on rate-making applications.

Such articles, in general, suggest the need of employing various scientific experts, such as accountants, economists, engineers, lawyers, etc., all of whom must be employed and assigned to their definite lines of investigation, so that they may thus prepare and help to present, and argue, their special lines or theories in the case before the Commission.

It is, no doubt, necessary to have such able and expert assistance in cases representing very large utilities, where the volume of business and earnings justify the employment of such experts, but it must be borne in mind that the great majority of the gas companies in America are small and cannot afford to employ such an array of scientific experts to aid them in the preparation and presentation of their cases.

As a matter of fact, it seems that it should be largely the work of the local manager to prepare and present his own case, assisted by his legal advisor, who should be familiar with the various details of the company's operating conditions and financial affairs; and if there is any merit in the application for increased rates, I believe they could much more effectively, and without arousing suspicion or doubt, present their case more convincingly before the Commission than by the employment of such experts.

I believe this is particularly true of the small gas companies, and with the hope that the knowledge of the methods and procedure employed, in preparing and presenting our own cases before the Commission, may be helpful to the managers of small properties, I will state, in a general way, how our case was prepared, developed and presented to the Commission with satisfactory results.

My knowledge of rate cases is limited principally to my experience and observation in connection with the Tennessee Railroad and Public Utilities Commission, and my remarks must, therefore, be confined entirely to my personal experience in seeking increased rates for our company before the Tennessee Commission.

Prior to 1919, the various public utilities in Tennessee were operated under local franchises, which had been granted during a period of years before the world war, when economic conditions were established and generally uniform, and the rates, tolls, fares and charges, in most instances, were specifically set forth in said franchises, with clauses inserted therein prohibiting an increase in such charges, though allowing a review of the operating and financial conditions of the various utilities at certain periods, whereby such rates or charges might be further reduced, but never increased.

As no one ever dreamed of a calamity befalling the utilities such as that which was the outgrowth of the world war, whereby every economic condition touching every phase of the routine operation of a public utility was upset; and, as a consequence, the utilities were confronted with abnormal increases in the cost of labor and all manufacturing materials, and increased costs of every other commodity entering into the delivered cost of their product, with no possible chance of the utilities securing such proportionate increased rates and charges as would yield a fair return upon their investment and save them from receivership, and as a consequence before the necessary legislation could be obtained in Tennessee, whereby they could receive this most necessary relief, many of our large utilities were forced into receivership.

The Need Was Recognized

There were many able and courageous men in our State who recognized the importance, from the standpoint of the public, that the utilities should be allowed increased rates, following the enormous never-to-have-been-anticipated rise in the cost of labor and manufacturing materials, so that the remaining utilities might be saved from receivership, and those in the hands of receivers be allowed to earn a fair rate on their investment, which would enable them to re-establish themselves upon a firm financial footing. These views were not entertained for the sake of the stockholders or investors, but that the utilities might be maintained, in order that the public might be protected against any interruption in adequate and essential service. As a consequence, the Tennessee Legislature of 1919 passed a Utilities Act, creating a Public Utilities Commission, and vesting it with the necessary powers to review existing rates and grant such changes in rates as would enable the utilities to earn a fair re-

*Paper presented at Southern Gas Association Convention.

EXHIBIT A—DETAILED OPERATING EXPENSES

ACCOUNTS	1913	1914	1915	1916	1917	1918	First Five Months of Year 1918.	First Five Months of Year 1919.	Estimated cost for year July 1, 1919, to July 1, 1920, in proportion to cost of 5 mo. of this year.
PRODUCTION COAL GAS									
Production Supervision	$ 2,740.54	$ 2,170.22	$ 4,815.59	$ 5,340.13	$ 5,704.39	$ 7,253.92	$ 2,376.69	$ 3,791.78	$ 9,100.56
Boiler House Labor			1,791.28	2,034.17	2,247.89	3,286.03	1,163.08	1,656.39	3,975.36
Retort House Labor			11,294.32	11,266.77	12,458.45	25,529.05	7,436.71	10,048.27	24,015.80
Purification Labor	1,298.60	1,678.42	1,332.81	2,013.75	2,236.97	2,924.08	1,021.50	1,204.95	2,891.88
General Labor			1,214.24	1,306.71	1,439.26	1,474.80	643.67	951.75	2,184.20
Boiler Fuel	2,507.49	2,264.10	2,131.28	4,237.48	4,906.11	7,322.81	3,135.44	2,450.13	5,881.56
Fuel under Retorts	13,611.58	11,329.89	10,153.65	10,871.17	11,994.21	23,042.76	9,280.26	9,272.02	18,434.20
Gas Coal	88,465.18	78,914.35	69,946.75	73,955.43	96,572.72	153,433.54	59,293.19	65,872.38	156,037.50
Coal Gas Enricher	5,812.24								
Purification Supplies	380.62	601.72	590.30	707.73	539.35	1,152.48	152.48	202.40	963.50
Water	224.64	37.15	15.78		96.45	470.18	130.39		460.00
Production Supplies and Expenses			3,583.31	1,992.58	2,066.46	3,574.85	1,117.61	1,306.33	3,135.12
Maintenance Buildings			687.93	709.35	595.78	830.49	270.83	609.31	1,462.32
Maintenance Apparatus			7,487.31	7,150.89	10,081.46	24,004.50	8,692.30	9,435.96	21,646.28
Expense Works	5,684.13	5,090.64							
Manufacturing Labor	18,625.14	15,621.58							
Repair Work	3,549.03	9,631.04							
Total	$142,899.19	$127,339.11	$114,044.57	$121,585.75	$150,939.50	$254,317.58	$ 95,214.15	$106,801.57	$250,188.28
Less Residuals	65,720.40	65,455.77	60,801.98	59,147.28	78,703.19	132,939.99	57,239.91	49,266.64	101,834.64
Total Coal Gas	$ 77,178.79	$ 61,883.34	$ 53,242.59	$ 62,438.48	$ 72,236.31	$121,377.59	$ 37,974.24	$ 57,534.93	$148,353.80
PRODUCTION WATER GAS									
Production Supervision	$ 344.39	$ 190.51	$ 678.97	$ 582.94	$ 1,459.73	$ 1,602.86	$ 632.68	$ 719.49	$ 1,726.80
Boiler House Labor			401.32	302.08	702.51	1,461.74	371.10	662.32	1,589.52
Generator House Labor			679.79	540.29	1,563.04	5,009.54	1,440.40	2,071.81	4,972.32
Purification Labor	105.03	141.83	399.63	326.05	670.50	1,888.93	347.45	410.48	985.68
General Labor			219.95	196.50	446.53	638.07	218.25	377.58	906.24
Boiler Fuel	539.71	204.98	362.13	843.32	1,511.59	3,157.69	1,029.03	1,512.23	2,870.23
Generator Fuel	1,945.95	1,637.45	2,556.10	2,256.33	4,518.64	9,887.51	3,149.88	3,887.56	6,182.26
Oil Water Gas	6,177.70	3,016.37	4,509.40	2,256.33	16,055.90	33,302.82	8,747.43	15,717.71	21,134.43
Purification Supplies	24.18	51.92	69.77	53.22	84.80	1,026.92	26.92	83.12	199.54
Water			2.37		32.84	196.06	40.47		
Production Supplies and Expenses			329.97	298.10	690.85	1,363.50	347.31	441.95	1,060.68
Maintenance Buildings			146.51	100.08	132.22	435.19	9.14	165.18	396.36
Maintenance Apparatus			1,775.59	1,283.28	4,268.73		780.14	1,372.34	3,293.64
Expense Works	659.62	462.83							
Manufacturing Labor	610.43	568.46							
Repair Work	231.99	578.72							
Total	$ 10,639.00	$ 6,853.07	$ 12,131.50	$ 11,481.00	$ 31,152.43	$ 64,237.56	$ 17,140.20	$ 27,421.77	$ 45,317.80
Less Residuals									
Total Water Gas	$ 10,639.00	$ 6,853.07	$ 12,131.50	$ 11,481.00	$ 31,152.43	$ 64,237.56	$ 17,140.20	$ 27,421.77	$ 45,317.80
Total Coal Gas and Water Gas	77,178.79	68,736.41	65,374.09	73,919.48	103,388.74	185,615.15	55,114.44	84,956.70	193,671.60
Enricher		4,884.87	5,670.94	3,663.67	5,334.25	224.15			
Gain or Loss in Holder	34.43	126.37	29.20	101.10	26.50	18.05	45.95	34.55	
Total Cost	$ 87,783.36	$ 73,494.91	$ 71,015.83	$ 77,593.55	$108,696.49	$185,857.35	$ 55,160.39	$ 84,991.25	$193,671.60
DISTRIBUTION									
Distribution Supervision	$ 1,593.28	$ 2,491.64	$ 4,380.50	$ 5,653.66	$ 6,280.50	$ 6,192.40	$ 2,802.66	$ 3,017.67	$ 7,244.76
Distribution Office Expense	1,783.94	2,221.09	1,286.60	671.90	860.71	1,560.01	342.90	702.82	1,686.72
Service Exp. or Complaint Exp.	2,359.19	4,179.51	1,942.74	5,119.75	6,470.53	11,974.97	3,314.13	3,101.17	7,442.76
Consumers Premises Exp., Grate Wk.	3,192.96	4,412.75	3,814.72	4,410.67	5,042.92	4,717.85	1,790.39	1,713.85	4,113.24
Maintenance of Mains	729.33	1,915.17	1,696.93	1,494.86	3,845.10	3,289.03	1,550.27	1,883.45	4,520.28
Pumping Drips			292.50	123.52	382.21	308.91	196.68	117.00	280.80
Maintenance of Services	387.93	1,152.27	1,293.82	2,250.03	1,945.68	2,235.83	795.25	861.61	2,067.84
Maintenance of Meters	4,135.19	5,306.12	1,477.67	2,172.53	1,712.74	5,048.62	2,572.14	2,488.95	5,973.48
Resetting and Removing Meters	2,551.99	2,276.53	2,161.93	1,803.83	2,318.04	2,731.41	1,068.24	1,694.99	4,067.88
Turn on and off Expense			754.05	767.56	1,020.59	1,208.44	536.08	566.77	1,357.80
Distribution Pumping			425.42	354.05	373.57	619.41	249.71	295.69	709.68
Residence Burner Maintenance					1,349.40				
Total Distribution	$ 16,733.81	$ 23,955.08	$ 19,528.88	$ 24,821.75	$ 31,601.99	$ 39,906.94	$ 15,218.44	$ 16,442.97	$ 39,465.24

GAS MADE DURING YEAR 1918

Coal Gas, 293,659.00 cu. ft. Water Gas, 128,484,100 cu. ft. Leakage, or per cent of Gas unaccounted for, 50,546,800 cu. ft., or 11.97%.
32,850 tons @ $4.75, yield 4.75 ft. per pound. 32,850 tons coal will yield 70% or 22,995 tons of Coke. Tar and Ammonia sales, 1918, $10,159.48.

ESTIMATES FOR YEAR JULY 1, 1919, TO JULY 1, 1920:

		Tons
$4.00 fuel under retorts, 19-20	$18,434.20	4,608.55
$2.70 and $4.00 fuel under boilers, 19-20	8,751.79	2,917.26
4.00 fuel in generators, 19-20	6,182.26	1,543.54
2.50 coke for sale (breeze), 19-20	8,702.50	3,481.00
4.75 coke for sale (lump), 19-20	49,604.25	10,443.00
	$101,834.48	22,995.35

Coal Gas Make 312,075,000
Water Gas Make 88,318,000
Tar and Ammonia sales same in 1919-20.

Boiler fuel 2/3 breeze @ $2.50 per M, 1/3 lump @ $4.00. Average price, $3.25 per ton at 20 lbs. per M. Generator fuel @ $4.00 per ton, 35 lbs. per M. Oil, 6.30 cts. per gallon, 3.80 gals. per M.

turn on the actual value of their property, used and useful, in rendering service to the public.

Our company was among the first to make application for increased rates, after the passage of the Utilities Act, and was the first gas company to be granted a hearing for an emergency increase in rates.

A formal hearing was, therefore, held before the Commission on June 30, 1919, when proper presentation of the necessary financial and manufacturing cost statements, and other pertinent data, was presented to substantiate our application for an increased emergency rate. The Commission was

EXHIBIT A2—DETAILED OPERATING EXPENSES—(Continued)

ACCOUNTS COMMERCIAL	1913	1914	1915	1916	1917	1918	First Five Months of Year 1918.	First Five Months of Year 1919.	Estimated cost for year July 1, 1919, to July 1, 1920, in proportion to cost of 5 mo. of this year.
Commercial Salaries	$ 1,530.76	$ 1,634.34	$ 10,495.19	$ 10,003.81	$ 10,376.74	$ 12,275.16	$ 4,860.35	$ 5,774.61	$ 13,680.00
Collection Expense	3,207.32	4,774.62	5,593.06	4,789.59	4,717.97	4,467.65	1,731.28	2,841.36	6,500.00
Meter Reading			1,711.15	1,834.29	1,987.27	2,709.35	949.08	1,687.37	3,200.00
Office Expense	4,337.25	5,017.25	4,477.21	3,425.47	4,316.67	3,726.07	943.99	2,595.01	4,000.00
Commercial Supervision			1,636.49	1,477.28	1,335.78	1,263.24	525.59	707.67	1,520.00
Office Salaries	14,990.16	14,750.80							
Total Commercial	$ 24,065.49	$ 26,177.01	$ 23,913.10	$ 21,530.43	$ 22,734.43	$ 24,441.47	$ 9,010.29	$ 13,606.02	$ 28,950.00
Salaries of General Officers			$ 1,200.00	$ 900.00	$ 900.00	$ 925.02	$ 375.00	$ 375.03	$ 900.00
Salaries of General Off. Clerks			1,289.36	1,606.26	1,769.21	2,357.40	1,069.75	939.11	2,253.84
General Office Supplies			1,556.92	560.91	1,080.64	692.16	293.34	386.64	1,004.98
Legal Expense	$ 2.15	$ 500.00	562.50	381.10	1,800.00	552.09	229.35	2,008.34	4,819.80
Insurance	3,705.64	2,902.93	2,933.17	2,271.87	2,990.54	2,616.99	1,065.17	1,116.20	2,678.88
Injuries and Damages		1,350.76	1,117.36	1,421.39	1,511.40	1,858.24	705.37	857.06	2,056.92
Uncollectible Gas Bills		3,860.59	2,799.98	2,738.11	2,016.08	3,809.00	1,392.49	1,554.40	3,730.56
General Expense	1,043.34	2,328.12	1,692.01	4,217.11	4,273.67	5,086.85	1,656.73	2,459.19	5,902.08
Vendome Building		1,693.62	2,851.04	643.43	1,966.63				
Interest	790.21	7,865.57	5.05	8.66	12.28		2.04	6.64	15.96
Record Expense				3.69	3.00				
Worthless Checks			86.78	28.40					
Fire Loss No. 1			1,286.21						
Association Meetings	313.62	450.64							
Expense Extraordinary	8.00	299.47							
Total General	$ 4,282.04	$ 20,303.93	$ 14,707.96	$ 14,780.84	$ 18,323.45	$ 17,902.86	$ 6,788.24	$ 9,702.61	$ 23,363.02
Taxes	$ 55,959.83	$ 58,391.05	$ 61,743.27	$ 59,231.58	$ 61,004.05	$ 48,175.57	$ 27,046.62	$ 25,814.53	$ 56,928.00
Federal Tax on Bond H. Inst.		1,047.50	674.00	619.75	1,341.50	146.50	35.00	61.00	
PROMOTION									
Promotion Supervision						$ 2,278.97	$ 923.77	$ 854.61	$ 2,051.04
Promotion Supplies and Expense						742.95	299.58	307.95	739.08
Miscellaneous Advertising						431.71	252.38	A 17.50	324.00
Newspaper Advertising						805.42	528.72	A 113.09	1,545.12
Soliciting						7,223.14	3,530.38	2,466.24	5,919.00
Appliance Demonstration						673.74	464.18	A 184.60	1,553.36
Total Cost Promotion						$ 12,157.93	$ 5,999.01	$ 3,945.99	$ 12,135.60
Credits						16,918.03	5,470.20	2,852.40	6,845.76
Net Cost Promotion						$ 4,760.10	$ 528.81	$ 1,093.59	$ 5,289.84
Total Operating Expenses	$188,824.53	$203,368.68	$191,583.04	$198,577.90	$243,701.91	$312,984.59	$113,787.79	$151,711.97	$347,667.70
Gas Sold	283,618M	300,117M	279,340M	283,965M	302,258M	371,632M	141,075M	171,374M	357,494M
									*$ 87,470.00
									† 357,494.00
GROSS REVENUE AND NET INCOME									
Gross Revenue	$293,225.91	$303,770.09	$282,190.93	$287,710.80	$305,865.97	$377,387.69	$142,850.40	$172,945.05	$454,964.00
Operating Expenses	188,824.53	203,368.68	191,583.04	198,577.90	243,701.91	312,984.59	113,787.79	151,711.97	347,667.70
Income from Operations	$104,401.38	$100,401.41	$ 90,607.89	$ 89,132.90	$ 62,164.06	$ 64,403.10	$ 29,062.61	$ 21,233.08	$107,296.30
Non-Operating Revenue			52.82	3,517.82	300.48	944.86	425.51	146.53	
Gross Income	$104,401.38	$100,401.41	$ 90,660.71	$ 92,650.72	$ 62,464.54	$ 65,347.96	$ 29,488.12	$ 21,379.19	$107,296.30
Income Deductions	103,830.00	100,000.00	116,790.01	124,596.67	130,385.00	134,480.00	55,566.66	56,366.66	144,280.00
Net Income (Loss)			$ 26,129.30	$ 31,945.95	$ 67,920.46	$ 69,132.04	$ 26,078.54	$ 34,987.47	§$ 36,983.70

*Estimate income from 75c service charge.

†Estimate income from Gas sales.

§Actual loss which we will have, inclusive of total revenue received from 75c service charge.

vested with the power to grant such emergency relief as then seemed necessary, pending, however, an appraisal and inventory of our property, and when the same had been made and completed, by the appraisers appointed by the Commission, another hearing would be had, based upon said appraisal and inventory, looking to the establishment of just and equitable rates.

The data shown herewith, therefore, shows, in a simple way, the manner in which our application for emergency rates was presented. It must, however, be borne in mind that the several items shown upon the various exhibits were discussed in detail, and illuminated in every way, through constant questioning by the Commissioners, city officials, and others.

Our system of accounting is that approved by the American Gas Association, and we, therefore, show their various classifications, etc.

Exhibit "A" shows comparative detailed operating expenses for the years 1913 to 1918, inclusive, and for further comparison, the first five months of 1918 and 1919; also, an estimated cost per year from July 1, 1919, to July 1, 1920, in proportion to the costs for the first five months of 1919. This exhibit enabled the Commissioners very readily to see and appreciate the enormous yearly increases in the costs of labor, materials, supplies, maintenance, etc., and the reasons for continued increased costs. So that the Commission might have a more thorough knowledge and arrive at a more correct understanding, we have also shown on this exhibit the amount of coal and water gas made in 1918, the total leakage for that year and per cent of leakage. Also, an estimate of the number of tons of coal to be used in the following year, the cost of same, and yield of gas per pound of coal carbonized, coal gas estimated to be made, average daily make of coal gas, yield of coke in tons, gas sales, and receipts from coke, tar and ammonia, from 1918 to July 1, 1920.

Also, there is shown the cost of the fuel to be used under the retorts, boilers, and in generators, the estimated amount of water gas to be made, the

cost of boiler fuel, generator fuel and oil, and the amount to be used per M. The additional data shown on Exhibit "A-1" was verified from actual operating conditions, and such other data shown, as to sufficiently convince the Commission of the approximate accuracy of these estimates. The same methods were followed in presenting and showing the increased distribution costs.

Exhibit "A-2" shows the commercial, general and other incidental costs for the same period, in the same detail, finally showing the total operating expenses for the entire period, and the estimates for the ensuing year. Also, the gas sold, net and gross revenues, and net profit. On this exhibit, it will be noted, in the last column we show an estimate of what our increased revenues would be for the ensuing year, if we were allowed a service charge of 75 cents per meter per month, this being the means through which we had hoped to be able to secure necessary and sufficient increased revenues without changing our base gas rates.

In order that the Commissioners and others might more readily understand and appreciate certain items of increased cost, as shown on Exhibits "A-1" and "A-2," we made certain additional exhibits showing specific large increases in costs, as will be noted from Exhibit "B." The increased costs of labor and of gas coal are shown separately for the years 1915 to 1918, inclusive, these being the two largest items of increased costs.

Driving Home the Story to the Commission

In order that the Commission might be made to realize that the increased costs of the manufacture of gas were not peculiar to Nashville, we compiled a list of a number of other cities, doing considerably more business than Nashville, as shown by Exhibit "C," which showed their previous rates and the increased rates which had been granted them.

Exhibit "D" showed first a letter from the President, Woodrow Wilson, to the Secretary of the Treasury, Wm. G. McAdoo, in which President Wilson stated: "It is essential that these utilities should be maintained at their maximum efficiency, and that everything reasonably possible should be done with that end in view. I hope that State and local authorities, where they have not already done so, will, when the facts are properly laid before them, respond promptly to the necessities of the situation." Also, a letter of acknowledgment from Mr. McAdoo to President Wilson, in which he says, in closing: "I earnestly hope that you may feel justified in expressing the conviction that the vital part which the public utilities companies represent in the life and war-making energy of the nation ought to receive fair and just recognition by State and local authorities."

This exhibit also showed an excerpt from the annual report of the Comptroller of the Treasury to Congress, showing some of the enormous increases in the cost of supplies and commodities necessary and essential in our business, which exhibit further tended to convince the Commissioners that the utilities were in dire need of increased rates.

Exhibit "E" showed our gas sales per year, from the years 1912 to 1918, inclusive, and an estimate of the sales for the following year, which estimate was based upon our securing increased rates, and making a small allowance for decreased sales, which would necessarily ensue when increased rates were made effective.

Exhibit "B"

The two largest increased items of cost entering into the expense of operating the company are labor and gas coal, and are as follows:

	Labor	Gas Coal
Year 1915	$ 68,759.26	$ 69,946.75
Year 1916	71,788.90	73,955.41
Year 1917	83,934.90	96,572.72
Year 1918	118,717.85	153,433.54

Above labor charges are exclusive of all labor chargeable to Betterments, Extensions and Improvements.

Exhibit "E"

Gas Sales Per Year Since 1911

1912	276,579,200 Cubic Feet
1913	283,618,500 Cubic Feet
1914	300,116,900 Cubic Feet
1915	279,340,600 Cubic Feet
1916	283,965,500 Cubic Feet
1917	302,258,600 Cubic Feet
1918	371,632,400 Cubic Feet

Estimated July, 1919, to July, 1920, 357,494,000 cubic feet.

Exhibit "C"

Rate Increases Allowed by Public Utilities Commissions During the Past Year in Different Parts of the United States

	Rates Prior to 1917-18	Present Rates	Proportionate sales of gas by these companies as compared with sales of this Company.
Albany, N. Y.	$1.00 per M. net.	$1.30 per M. net.	200% more than Nashville.
Buffalo, N. Y.	1.00 per M. net.	1.45 per M. net.	250% more than Nashville.
Lowell, Mass.	1.05 per M. net.	1.20 per M. net.	225% more than Nashville.
New Orleans, La.	1.00 per M. net.	1.30 per M. net.	500% more than Nashville.
Providence, R. I.	.95 per M. net.	1.40 per M. net.	500% more than Nashville.
Scranton, Pa.	.95 per M. net.	1.30 per M. net.	150% more than Nashville.
Spokane, Wash.	1.40 per M. net.	1.57 per M. net.	75% of Nashville.

Albany is a municipal gas plant.

Exhibit "F"

Gas Sales

	Actual 1917-1918	Actual 1918-1919		Estimated 1919-1920	
July	24,861,600	31,253,200		29,833,900	
Aug.	26,155,000	32,026,600		31,386,000	
Sept.	26,148,400	33,906,700		31,378,100	
Oct.	26,995,700	34,458,900		32,394,800	
Nov.	24,883,900	32,680,500		29,860,800	
Dec.	26,563,600	37,074,800		31,876,300	
Jan.	28,768,900	35,526,500		34,522,900	
Feb.	27,105,200	35,590,600		32,526,200	
Mar.	26,573,500	36,700,500		31,889,200	
Apr.	28,616,400	32,694,300		34,339,700	
May	30,335,000	32,675,100		33,368,500	10%
June	30,104,900	32,362.800	(7.5%)	33,115,400	10%
	327,112,100	396,950,500		386,491,800*	
7½% estimated decrease due to change in rate				28,997,800	
Estimated sales due to rate change				357,494,000	

*Estimated sales if price remained $1.00.

Exhibit "F" showed the actual monthly sales in cubic feet, from July, 1917, to July, 1918. Also, from July, 1918, to July, 1919, and an estimate of sales from July, 1919, to July, 1920, which were based upon the then selling price of gas of $1.00 per M.

Exhibit "G" shows the estimated gas sales for the ensuing year, number of meters in service, amount of gas sold, per meter, per year, amount of gas sold, per meter, per month.

Exhibit "G"

Estimated gas used per meter per month for the year July 1, 1919, to June 30, 1920:

Estimated gas sales	357,494,000	cu. ft.
Estimated active meters in use	11,400	
Amount of gas used per meter per year	31,710	cu. ft.
Amount of gas used per meter per month	2,640	cu. ft.

Exhibit "H"

COKE SOLD DURING YEAR 1918

	Tons		Average Per Ton
To Trade	12,480.33	$92,441.58	$7.40
USED—			
Under Retorts	4,608.55	23,042.76	5.00
Under Boilers	3,186.00	10,480.50	3.27*
In Generators	1,997.50	9,887.51	5.00
YEAR 1919—SOLD TO TRADE			
January	1,037.89	7,132.63	6.87
February	863.62	6,509.74	7.53
March	665.04	4,646.16	6.98
April	705.73	4,521.34	6.40
May	1,482.68	6,621.18	4.46

*2/3 breeze.

For the year beginning July 1, 1919, it is estimated that the company will not receive for coke more than an average of $4.75 per ton.

EXHIBIT "I"

Estimated Loss of Consumers from Service Charge
Meters in Service, June 1, 1919, 13,411

Regular Meters, 9,998; Prepay Meters, 3,413

Monthly service charge	$0.50	$0.60	$0.65	$0.70	$0.75
Estimated loss of meters	6%	8%	10%	12%	15%
Meters in use, June 1, 1919	13,411	13,411	13,411	13,411	13,411
Loss as above	805	1,063	1,341	1,609	2,011
Meters in use (service charge)	12,606	12,348	12,070	11,802	11,400
Monthly income, service ch'ge	$ 6,303.00	$ 7,408.80	$ 7,845.55	$ 8,261.40	$ 8,550.00
Less 5% uncollectible	315.15	307.40	392.25	413.10	427.50
	$ 5,987.85	$ 7,038.40	$ 7,453.30	$ 7,848.30	$ 8,122.50
Yearly income, service ch'ge	$71,854.20	$84,460.80	$89,439.60	$94,179.60	$97,479.00

If in the judgment of the Commission it is deemed more equitable to grant a Service Charge of 50 cents per meter per month and an increase in rate of 10 cents per thousand cubic feet or from $1.10 gross, $1.00 net, to $1.20 gross, $1.10 net, the following would be the estimated gross revenue:

357,494,000 cubic feet @ $1.10	$393,243.40
Service charge of 50 cents per meter per month	71,854.20
Total gross revnue	$465,097.60

If the Commission grants the relief asked by allowing a 50-cent per month service charge and a rate of $1.20 gross, and $1.10 net per thousand cubic feet, then the Company for the next year will still lose $27,950.10.

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In a situation where most of the gas made was from coal, it is very natural that the general high selling price of coke, and the proper credit for same, would be an important factor in determining either an emergency or permanent rate. Exhibit "H," therefore, shows the tons of coke sold during the year, 1919, rates for same, and the average selling price per ton. Also, the amount of coke, in tons, used under retorts, and the price which we charged Production Coal Gas per ton for same; the number of tons used in our boilers, and in water gas generator, and the amount charged per ton. We show thereon, also, the number of tons of coke sold in January, February, March, April, and May, of 1919, the receipts for same and the amount received for same per ton.

As stated, we hoped to be able to convince the Commission of the reasonableness of a service charge, and to secure our total emergency relief through their approval and application of a service charge, and after presenting the various comparative cost data, we gradually led up to the service charge, as will be noted from Exhibit "I," which shows somewhat in detail the estimated effect the application of a service charge would have on gas sales, based on various rates of charges of from 50 cents to 75 cents per meter per month.

Exhibit "J" is an estimate of gross revenue that would be received if the Commission approved of allowing us an increase in block rates, as shown thereon, instead of a service charge, as we believed the Commission would realize that an emergency increase in revenues was necessary and they would, therefore, have two different methods of determining just how this increase relief could be obtained. This exhibit gives other data, as you will note, which was necessary and pertinent.

Showed the Losses

To further substantiate our previous argument and show the enormous losses we had been sustaining for several years, on account of the low selling rate, and the enormous increased operating expenses, Exhibit "K" shows our losses from 1915 to 1918, inclusive, and an estimate for the following year, based on the Commission allowing a service charge of 75 cents per meter per month.

Exhibit "J"

Estimated gross revenue that will be received from July 1, 1919, to June 30, 1920, in event rate increases shown below are allowed.

Conservative estimate in sales due to service charge or rate increase from July 1, 1919, to June 30, 1920. Estimated sales, 357,494,000.

0 to 10,000	80 %	285,995	M.	@	$1.30	net	$371,179.35
10,000 to 30,000	7½%	26,812	M.	@	1.20	net	32,174.40
30,000 to 50,000	7½%	26,812	M.	@	1.10	net	29,493.20
Over 50,000	5 %	17,875	M.	@	1.00	net	17,875.00
		357,494					$450,721.95

Average rate, $1.26. Minimum monthly bill, $1.00.

From minimum monthly bills of $1.00 it is estimated the company will receive during said year $4,800 in revenue, which, added to above sum of $450,721.95, will yield $455,521.95 gross revenue for the entire year.

Deducting the special franchise tax to be paid the city of 5% of the gross revenue received from sale of gas and by-products, will leave the company for said year the gross revenue of $432,744.95. If the commission desires to grant the emergency relief prayed for in the form of an increase in rates rather than in the form of a service charge.

With the rate increased as above shown, the company will still have a loss during said year of $36,425.75.

At this point, the question may arise in the minds of some as to why we applied for an increased rate, which would not, according to our figures, enable us to meet our total operating expenses and fixed charges, thus showing a deficit, even if the increased rates prayed for were allowed.

A most important condition, which is peculiar to Nashville, made this necessary. The fact that Nashville is right on the edge of enormous coal fields, and the price of domestic coal has never been extremely high here, as there was always an abundant supply of such coal in Nashville at reasonable prices, even though we found it very difficult to get, at reasonable prices, good gas coal, which came from foreign fields; this condition, therefore, compelled us to ask for a rate which would indicate a concession on our part and consequent loss, which was due primarily to the fact that we feared that a higher rate would cause us to lose much of the business we then had, and would, consequently, make our losses in the future greater than we had estimated. We were, therefore, contesting for only a minimum increased emergency rate, believing that, in the near future, the inflated costs of labor, materials and other necessary supplies would decrease, and thus permit of larger earnings than at that time seemed apparent. We also desired to find out just how our customers would regard increased rates, which, if favorable, would permit us in asking for fair and adequate rates when the hearing would later be given to establish permanent rates, based upon an inventory and appraisal of our property and other conditions.

Exhibit "K"

Losses of the Nashville Gas and Heating Company

Year 1915	$26,129.30
Year 1916	31,945.95
Year 1917	67,920.46
Year 1918	69,132.04
7-1-19 to 6-30-20	36,983.70*

The above losses for the years shown do not include any depreciation charges.

By recognized standards, fairly applicable to Nashville, annually a depreciation of 7c per 1,000 cubic feet of gas sold must be figured by the company; and adding this proper depreciation charge to the losses above shown, the same, accurately stated, will be as follows:

Year 1915	$45,683.10
Year 1916	51,823.50
Year 1917	89,078.52
Year 1918	95,146.28
7-1-19 to 6-30-20	62,008.28*

*If service charge of 75c is allowed.

In Nashville, as possibly in other cities, there are generally rumors that all utilities are overcapitalized, and when an application for increased rates is made, one of the first claims of the public is that the utility desires these increased rates so as to enable it to earn dividends on watered stock. The Public Utilities Act and the previous rulings of the Commission specifically provided that rates, whether emergency or permanent, must be based upon the actual investment, used and useful, in serving the public, regardless of the capitalization, as shown on the company's books or their financial records.

Financial Statement Compiled

It was, therefore, necessary for us to compile a financial statement, approximating the actual moneys paid for and expended on betterments and improvements to the property. Therefore, Exhibit "L" shows an approximate cost of the physical properties of the company, from the time it was purchased in 1911 up to the time of the hearing, this method being adopted so as to establish a base upon which an emergency rate could be intelligently worked out.

Exhibit "M" showed copy of the franchise ordinance, under which our company was operating, which franchise ordinance had not been abrogated by the passage of the Public Utilities Act, only those sections which fixed a permanent rate of charge therein being set aside; all of the other many and varied franchise obligations were to continue in effect.

(Continued on Page 432)

Gas Sales Association of New England Holds Annual Meeting

The annual meeting of the Gas Sales Association of New England was held at the Boston City Club on Friday, May 11, 1923. About 125 members and guests were present. Reports of the various officers were read, after which the election of officers for the year 1923-1924 took place.

F. A. Woodhead of Arlington, Mass., was re-elected governor of the association for another term and the new members elected to the board of managers are as follows: J. H. Sumner, G. P. Velte and L. W. Geffine.

In his address to the association Governor Woodhead stated that the association had continually strengthened and flourished and had created an influence for good upon the gas industry. He recommended that the offices of secretary and treasurer be combined into one office with a salary which will offer part compensation for the labor involved. This association has increased in size and the work of these two offices carried on so well by the present incumbents without charge, can now best be done in a manner according to our recommendations."

Selling Gas Through Water Heaters

Mr. E. S. Stack, manager of the Stack Division of the Riverside Boiler Works, Cambridge, Mass., addressed the members on "Selling Gas Through Water Heaters." His talk was illustrated with lantern slides, bringing out clearly the points which he wished to bring home.

When I received the invitation to speak before this association I felt greatly honored. When I began to think it over, I wondered what there was that I could say that would be of interest to you, knowing that this Gas Sales Association is made up of various interests, that is, the gas company men, manufacturers, manufacturers' agents and kindred interests in the gas industry. However, I accepted the invitation as a member of this association, and what I have to say tonight, I wish you to consider as coming from a member attempting to do his part. Most of you know that my effort in the gas industry has been in one direction for many years,—along water heating lines. As the name Gas Sales Association implies, the selling of gas, hence the title to this talk,—"Selling Gas Through Water Heaters."

Water heaters take their place next to the gas ranges, as a channel through which gas is sold, and as the gas range comes first, it is easy to understand the great importance of water heaters to gas companies.

The Gas Companies' Interest

No gas is sold through water heaters until they are purchased from the manufacturer, and placed on the gas lines. Here the gas company comes in contact with the manufacturing interest. Manufacturers have made almost endless efforts in selling gas water heaters, which, of course, in turn have enlarged the avenue through which the gas company sells its gas.

While the interests of the gas companies and manufacturers are closely allied, yet the interests of the gas company may be viewed from a different standpoint than that of the manufacturers. It might be said in a broad sense that the gas company's interest begins where the manufacturer's interest leaves off. The gas company begins to sell its product—gas—after the manufacturer has concluded his deal, and his heaters are sold. Then gas water heaters are sold to the customer, and connected up to the piping lines.

The gas company here again comes in contact with other interests, which may be used as an avenue to increase the sale of gas through water heaters,—the customer, the dealer or plumber who connects in the heater, the architect and the public in general. Consider the possibilities through the customers, he may pave the way for many future sales. Future sales will be made easier or harder, depending on how well the customer is satisfied with the hot water service he receives, and also how well satisfied he is with the price he pays for the hot water service. A satisfactory hot water service does not depend entirely upon the heater itself, but depends as much on the manner in which it is installed, and the conditions under which it has to operate. This being true, it is essential that all water heaters be selected, installed and set to operate so as to produce a hot water service, in keeping with the ideas of the user and also in keeping with the building in which it is installed. The customer's influence will then aid in making future sales.

Hot Water Service

Who should be more interested, and to whom does it mean more than to the gas companies, if they are to increase the output of gas through the customer's influence? In order to use the customer to make future sales, or in order that the customer may not block or be a hindrance to future sales, it is necessary that he should also be satisfied with the price which he pays for the hot water service.

Experience shows that in very few cases are the water heaters to blame for a complaint of the cost for hot water service. The complaint can usually be traced to one of several sources. A complaint is usually made because the customer did not have a clear understanding of what he would get for money paid, or the customer is acting on impressions, which he gets from some source outside of the gas company.

If gas companies are to use this customer channel for future opportunities, is it not reasonable that they should be in a position to furnish information regarding water heaters and heating water in general and practically dominate the water heater installations in their town?

Proper Information

Most complaints of high gas bills are not based on facts or the truth about the situation, but on some false conception or idea which the customer has gotten. Usually he has no idea of the value received for money expended, and at this point is there not a great opportunity for the gas companies to get into a position to present the proper information, thus showing the customer what he is receiving in service for the money expended, and also what it would cost him to accomplish the same with other methods? Would this not establish the

gas companies as the proper source of information on water heaters? Facts have turned complaining customers ready to say a good word for the gas company. If a complaint is justified, who would have more incentive than the gas company, to present the facts to the customer, and make the changes necessary, regardless of who made the sale? Would it not be better to head off complaints by seeing to it that these installations are made properly, and that the customer has a clear, definite understanding, and that the facts are presented to him so that he has really no ground for complaint, because he is getting just what he expected? A customer well sold will help future sales.

Co-operating With the Plumber

The dealer or plumber is a source of output which gas companies can well afford to cultivate in attempting to open up wide the sale of gas through water heaters sold through those agencies. The gas company is just as sure to get the complaint when the heater is installed by the plumber as by the gas company's man, and the effects on future sales is the same. Therefore, information from the gas company is needed for the plumber.

It is not hard to believe that dealers and plumbers could do a lot more selling and installing if they had the incentive, and were helped and co-operated with by the gas companies.

Does the dealer or plumber today know all he should about selecting and installing heaters? If he is allowed to continue without proper influence from the gas companies, to select and install any kind of heater whether it burns gas or not, because it gives him a little more profit, will the results be as satisfactory as the gas company might hope for?

Is it not true that if gas companies could add to the plumber's knowledge of water heaters, and to his business, the plumber would become interested, and in so doing keep the customer channel wide open by making proper installations, and at the same time have the plumber as an addition to the gas company's selling and installation forces? Most plumbers are reasonable men, and if shown anything to their advantage, are willing to participate in it.

The Architect

Architects have a great influence, which can be used to forward the selling of gas water heaters, and consequently the selling of gas. How many architects today are familiar with the various installations which produce the most satisfactory hot water service for the customer? Is he not left to the pulling and hauling of the various selling agencies? Is the attempt not made to fill his mind with details of construction and superiority of one heater over another, rather than the facts pertaining to heating water by gas? Is he not also dependent in many instances on information, which he gets from the plumber and if the plumber is not well versed and schooled in the advantages of gas, how can this influence revert to the profit of the gas company? The returns which the gas companies would get from increased sales of gas through water heaters would greatly repay for any efforts they might make, in giving the architects the plain facts about heating water by gas. The architect is not particularly interested in the form of the heater or its mechanical operation, but is more interested in the results it produces and in the various ways that heaters can be used to produce a service satisfactory to his client.

It should not be expected that the manufacturers or their agents can give much time to going further than in the interest of their own particular product. Therefore, if the architect is to be used as a means of selling gas through water heaters, is it not reasonable that the gas company is the logical source from which he must get his information? If coming from the gas company, will not this information be on such a broad basis that the architect will welcome it because he can use it to advantage?

The Public

The public in general, if the proper information were presented, could be used to forward sales. The public knows very little about water heaters or the results which they should produce, but they have a very distorted idea of the amount of gas which they use, when as a matter of fact, in the average home or building using less than 250 gallons of water per day, gas is cheaper, more efficient and more convenient than any other method. If this question were asked of a dozen men assembled in most any kind of a meeting, say at a club meeting or an association meeting, Which is the cheaper to heat water in the average home, gas or coal? The answer invariably would be Coal. If gas is cheaper, and better,—and it is, is it not reasonable that the gas companies themselves are the logical sources from which this information should come?—not merely because they are the gas company, but because it is of a vital interest to them that these facts should be broadcast.

I attended two conventions of different state associations of master plumbers, this spring, and here were gathered representative plumbers and dealers from every section in that state, and they were discussing business in general and the various subjects which naturally came up under the business of plumbing, not a word was said about gas; no information pertaining to it whatever. I thought what a wonderful opportunity for the gas companies in that state to have had a representative there giving the facts about heating water by gas, and coal, and other means, and in a broad sense adding to the plumber's information something that would be of service to him and of great importance to the gas company. Is this not another opportunity for gas companies to make further efforts to increase the output of gas through water heaters.

I attended a Rotary Club meeting recently, and I listened to a man tell something of his former occupation and of his present vocation. I saw men sitting there with their mouths and ears wide open listening to every word he had to say, because he was telling them something that was of interest to them in their homes. This club was made up of representative business men of that town and I thought here again, what a wonderful opportunity for the gas companies to tell the public, at such meetings as this, the plain facts about gas; what comforts

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As the Journal Views It

ANNOUNCEMENT

Walter A. Fairservis has resigned as editor of the American Gas Journal. His friends in the gas industry, we are sure, join us in wishing him every success in new undertakings.

DEVELOPMENT OF GAS INDUSTRY

There are some extremely interesting suggestions set forth in the article by W. D. Wilcox, published in this week's issue of the American Gas Journal, and while it may be felt by some that the writer was looking far ahead, it must be conceded that he thoroughly worked out his plans. We believe they are worthy of discussion by the entire industry.

It was not so long ago, comparatively speaking, that many of the practices that are now regarded as routine, were considered as radical and brushed aside. But since then, they have been thoroughly tested and proved to such an extent that they have replaced other methods that are obsolete and out-of-date. It may be that the same condition applies to the ideas advanced by Mr. Wilcox. At first reading they may seem to be without a basis that is workable, but with careful study they will be found to have precedents that are striking in their simplicity.

Take as an example the question providing a sort of bonus or subsidy for the consumer who turns from the use of coal in its raw state to the use of gas. It might be said that such a plan could not be placed in successful operation. Yet we have as a precedent the farmers' loan, which has proved successful as carried out by the Federal Government. There was a cry that this was "class legislation," but this has not proved to be so, and we are told that it is considered as extremely useful not only to the farmer but also to the ultimate consumer as well.

But what we are seeking is an expression of opinion from the readers of the American Gas Journal. We would like to get ideas as to whether the thoughts of Mr. Wilcox are considered as too advanced for use at present. Or it may be that other suggestions will be made that may either modify or extend the scope of the thoughts of the author. At any rate, the columns of the American Gas Journal are open to any comment that may be made.

Certainly there is no more important subject before the field today than that of an adequate supply of raw materials and the conservation of coal is receiving the serious attention of everyone. Perhaps Mr. Wilcox has given a solution for at least part of the problem. These thoughts are merely casual, and are offered in the hope that they will start discussion that will result in an exchange of ideas.

HEARST DENIES PUBLIC UTILITY PURCHASE

In a recent issue there appeared on this page an editorial based on news dispatches to the effect that William Randolph Hearst had embarked in the public utility business via a purchase of the controlling interest of a group of natural gas and oil properties. Since that time, Mr. Hearst has given the American Gas Association a denial that he is interested in this new organization in any way. According to the dispatches reaching this office, there appeared before the Public Service Commission of Kansas a man who was quoted as stating that he represented Mr. Hearst. It may be that the wrong impression got out because the man who was quoted is Philip Frances, formerly in charge of publications for Mr. Hearst. However, the denial by Mr. Hearst closes the incident.

NATIONAL ADVERTISING CLUBS MEETING AT ATLANTIC CITY

The Associated Advertising Clubs of the World will hold their annual meeting at Atlantic City, N. J., June 3 to 7. The Public Utilities Advertising Association, recently formed, is affiliated with the National Association, and special attention will be given to the subject of Utility Advertising. There will be public utility advertising exhibits, one of which is devoted to gas. We strongly urge every gas company to send a representative to this meeting. They are bound to carry away with them many valuable ideas regarding advertising and public relations work.

Age, Service Charges and Proof of Gas Meters

PART OF DISCUSSION OF THIS QUESTION BEFORE EASTERN STATES GAS CONFERENCE

By H. A. Norton, Boston, Mass.

My reasons for recommending the leaving of idle meters in service, a seven-year periodical test date, a fourteen-year periodical repair date, and the condemning of old, worn-out or small capacity meters, were arrived at from a careful study of the tests of meters brought in from service in the past five years. In this research I have been greatly aided by the gas companies in New England, and they feel that this information which has been collected may be of benefit to those who have not made a systematic analysis of their meter test records.

You can readily demonstrate the saving in actual money by leaving idle meters in service for a period of, say, nine months, and it is better for the meter to do so.

While the majority of gas companies are now testing their meters periodically, yet it is very important to segregate tests of different sizes of meters as well as the same size meters of different capacities. It is true that very few three-light meters are now being purchased, but many are still continued in service, and this, in my judgment, is false economy.

If you will analyze the tests of the three-light meters, you will find that they do not hold their proof as well as the five-light and larger sizes. If you will also analyze the tests of the former small capacity five-light meter, you will find that it does not hold its proof as well as the new, increased capacity meter, which has been designed and strengthened to withstand the ever-increasing peak load demand.

It is estimated by the gas companies that the average peak load demand in a house equipped with a double oven or cabinet range, in connection with a tank water heater, is approximately 125 cubic feet per hour. The three-light meters have a capacity of from 50 to 75 cubic feet per hour, and the former five-light meters have a capacity of from 100 to 110 cubic feet per hour. We find that these meters are generally overloaded, which results in lost motion and loss of registration.

In analyzing your meter tests, it is hardly fair to include these older meters with the meters purchased in more recent years, which meters have capacities sufficient to take care of the peak load demand. However, they are included in a report of the engineer of the New Hampshire Public Utilities, covering the test in 1921 of 30 per cent of the meters in service in that State.

New Hampshire has a five-year periodical test date, but many of the meters tested had been in service longer than that period. The tolerance by law in that state is 2 per cent fast or 2 per cent slow, and a report of the test of all meters removed from service is forwarded to the commissioners. The engineer states that the rule requiring the testing of meters implies that a reasonable accuracy to be expected of a gas meter is between the range of 3 per cent fast and 3 per cent slow. On this basis he found that 7.1 per cent of the meters tested were fast, the average error of the fast meters being 5.1 per cent. There were 6.5 per cent slow meters, the average error being 7.8 per cent. This would indicate that 85 per cent of the meters tested were correct with a 3 per cent tolerance.

An analysis of meters tested elsewhere in New England, based on a 2 per cent tolerance, shows about 70 per cent correct. When these meters are segregated as to size and age, the records show on a seven-year basis of new or repaired five-light and larger meters about 80 per cent correct.

Meter tests from one company in New England, who have in service approximately 50,000 meters, show the five-light and larger meters, segregated on the above basis, to test over 80 per cent correct, while the limited number of three-light meters which they have in service and which are twenty or more years old show an average of 54 per cent correct.

This same condition is shown on a like analysis of tests of meters of a company having approximately 30,000 in service, and another company having approximately 22,000 meters in service. The tests from another company, with meters on a five-year service basis, show 80 per cent correct. Continuing in service up to twenty years without repairs, those meters which tested correctly each five years, they found that the meters which were correct after fifteen years of service and tested after twenty years of service were only 52 per cent correct. This company also found that 77 per cent of the D. R. or stuck meters had been in service ten or more years without repairs.

In the past fifteen months we have repaired in our factory something over 20,000 meters. Of these, approximately 28 per cent required new diaphragms. Of these meters which required new diaphragms, we found that 55 per cent of the meters had been in service with the original diaphragms from fourteen to forty years.

We have two companies in New England who have been operating seventeen and twenty-one years. They have 5,000 and 12,000 meters in service, respectively. None of these meters are in the three-light size, and they are all practically the increased capacity five-light meter. The proof tests of all of these meters as they come in, regardless of age, show approximately 80 per cent correct.

The reports from these two companies confirm the statements which I have made covering the segregated tests from other companies, and the inadvisability of continuing the use of the three-light meters and the older, small capacity, or worn-out meters in the five-light and larger sizes.

THE DEVELOPMENT OF THE GAS INDUSTRY

(Continued from Page 420)

Customer ownership originating in the first instance in the impossibility of obtaining the capital needed for extensions from the wealthy class who formerly bought utility bonds, but who more recently are buying only tax-exempt issues, has helped to create a local interest favorable to the utility. The fact of progress in bettering public relations is an encouragement to further action rather than a reason for ceasing to act. The men in the gas industry should have the courage to advocate exemption of the utility from taxation, not because they would be the beneficiaries of this exemption (this must be made clear to the public), but because they are probably best informed as to reasons justifying such a proposal. There is no reason for their keeping silence or fearing discussion.

No Set Program

No program can be worked out in detail. So large a problem as making gas the universal fuel wherever pipes can be laid is one which can be solved only by united action and the meeting of many minds. As definite changes in the existing economic order which will contribute to this result, we suggest:

1. A substantial tax upon every ton of bituminous coal mined which is burned in the raw state within the limits of a municipality. The revenue from this source could be used to make good the deficit created by exempting the property of the gas utility from any form of taxation. It would probably be necessary to obtain authority from the state to impose such a tax. There might then be only a few communities possessed of the general intelligence to recognize both the justice and economic advantage of such a tax and the courage to impose it in the face of such opposition as might be expected. But the results from such action would in a short time stand out so clearly that other cities would hasten to take similar action.

2. Concurrently, an exemption of the property used by the gas company in rendering service, from every form of taxation.

3. The adoption of a three-way system of charge for gas which will as nearly as possible make the charge to the user correspond with the cost of serving him. This proposal has been so widely and intelligently discussed by others as to call for no more than its inclusion in the changes proposed.

4. The abolition of all standards of quality in gas which prevent the exercise of the fullest freedom on the part of those operating the gas utility in making and sending out the product, which investigation shows them will, under the conditions existing, at the particular time and place, enable them to give the largest value in service for a dollar of cost.

5. Continued study by gas engineers, with the encouragement and support of those who are connected with the industry as builders of gas plant and manufacturers of gas burning appliances, of means and methods by which the labor cost of gasification may be reduced, the thermal efficiency of generation increased, and materials made available for producing gas which are more abundant and more cheaply obtainable than those now generally used.

Along with these changes, there must be a disposition on the part of the public to permit the men in the industry and those who find or supply the capital to share in the benefits of a very great development in the industry. The gas company cannot undertake a program requiring a greatly increased investment of capital; the possible discarding of plant still physically usable, in order to install more efficient plant; the employment of engineering knowledge and commercial skill, and involving some elements of risk unless there are assurances of resultant profit. The money cannot be had except in competition with those who desire it for use in other fields. The investors must profit. The relations between the official representatives of the public and the company must be free from friction. Friction in the mechanical world represents an irrecoverable loss. So it does, generally speaking, where it exists between the public and the utility.

Assuming all of these changes made, it would be possible for gas to become the universal fuel in the office, shop and home. The gain to the users of gas in comfort, economy and convenience would be enormous, as well as the broadly shared indirect community and social benefits.

Demand for Gas Service Indicates City's Growth

One of the surest barometers of a city's growth is the increased demand for service made to public utility corporations, and judging Sacramento's growth by this, she is growing by leaps and bounds, especially in the East Sacramento district. This is the statement of E. W. Florence, division manager of the Pacific Gas & Electric Company here.

He said:

"The growth in the East Sacramento residential district has been the largest experienced in a number of years. The extent of it is indicated by the demand for gas.

"It has been found necessary on the part of the Pacific Gas & Electric Company to supply this section of the city with a new feeder system, involving the laying of 6,150 feet of six-inch main to take care of the demand.

"This work will involve an expenditure of approximately $18,994.

"The growth of this new section of the city is resulting in better business conditions through not only the direct increase in population that is indicated but also because the money spent in laying the new system comes right back into Sacramento through wages paid the workers of the company.

"This is illustrated in the annual message of A. F. Hockenbeamer, treasurer of the company, to the stockholders in which he states that the operating expenses of the company for a year, including depreciation and other items, amounted to $27,019,074. Of this, $8,989,560 was paid out in wages to men and women engaged in the purely operating activities of the company. This does not take into account a total of $5,378,000 paid to employees engaged in new construction; so that the total payroll for last year amounted to $14,368,000, all of which was distributed to California wage earners.

PRACTICAL SUGGESTIONS FOR RATE CASES

(Continued from Page 426)

Exhibit "L"

Cost of Physical Properties Now Belonging to Nashville Gas and Heating Co.

Paid for physical properties of predecessor company		$1,449,000.00
Paid City of Nashville in pursuance of city ordinance for right to acquire and operate above properties		100,000.00
Actual expenditures since operations of present company began for physical improvements and betterments:		
Real estate	$ 1,474.60	
Additions & improvements to manufacturing plant	19,332.92	
New meters	111,265.38	
New meter connections	359.16	
New service pipe extensions	104,783.97	
New stable and motor equipment	598.96	
New trunk lines and new mains (small)	115,642.10	
New high pressure mains (large) and governor stations	362,281.77	
Office equipment	474.74	
Rebuilding and improving holder No. 4	20,591.07	— $ 637,164.67
		$2,186,164.67
In addition to the above cost items the present company since it began operations has actually expended for solicitation of new business, advertising, etc.		$ 165,006.60
Actual working capital on hand, May 31, 1919		135,264.68
Total actual expenditures excluding interest on indebtedness for present properties		$ 2,486,435.95

Present Indebtedness of Nashville Gas and Heating Company

First mortgage, 5%, 25-year gold bonds	$ 2,000,000.00
Floating debt for money borrowed	688,000.00
Total present indebtedness	$ 2,688,000.00

The cost items first above given representing actual expenditures by the present company cover only physical properties and include nothing representing the value of the good will, established trade or "going value" of the company's business and properties.

On account of vast increases in the cost of labor and materials since the acquisition of the properties and the making of the physical improvements and betterments above mentioned, all of which are necessarily reflected in the present value of the company's physical properties, said physical properties are now worth largely more than $2,486,435.95, which represents actual costs of the company's physical property.

To further bear out the reasonableness and fairness of the service charge, Exhibits "N" and "O" showed a number of prominent business houses, and citizens of the residential sections of the city, who used gas only for emergency purposes, and, consequently, paid only the monthly minimum, fixed by the franchise ordinance, of 15 cents per month.

Exhibit "P" shows a readiness-to-serve charge worked out along the lines approved by the Wisconsin Commission and made applicable to our situation, at the bottom of which exhibit it will be noted that we then had a readiness-to-serve charge expense of $9.71 per meter per year, or of 81 cents per meter per month. To sustain our contentions for the readiness-to-serve charge, various court and commission decisions were cited and relied on, and considerable discussion followed, as the Commission had never before entertained an application for a service charge in any form whatever and were, therefore, considering the question as one of first impression.

Exhibits "Q," "R," "S," "T," "U" and "V" show tables of the various means by which the necessary revenues could be derived through the application of a service charge and increased rates combined.

Last, but not least, was Exhibit "W," showing in detail the total taxes paid for the year 1918, which, in the situation presented, was a most important factor entering into costs.

Emergency Rates Granted

After several days of argument and discussion, during which time these various exhibits were presented, the Commission finally approved of an emergency rate, by increasing the rate of gas from $1 net per M to $1.10 net per M., and allowed 50 cents per month per meter service charge, with the understanding that the Commission would appoint competent engineers and accountants to appraise our property, for the purpose of obtaining the necessary data, whereby a so-called fixed valuation could be established, upon which, finally, permanent rates could be based.

Very soon after our hearing was concluded before the Commission, and the emergency relief granted, practically all of the other gas companies in the State, which were also suffering heavy losses, made application for increased rates, and while most of them received such relief as the Commission, in their opinion, thought they were entitled to, based upon the exhibits shown in the applications, or the data and method in which the cases were presented, it was stated that many of those applying for a change in rates did not set forth the various and necessary important data, in a convincing manner, and in such order and sequence, as to enable the Commission to properly consider all pertinent facts and conditions, entering into and affecting their costs and consequent rates. Doubtless the lack of such data, in many instances, mitigated against, and prossibly prevented the utility from obtaining the increased rate which its actual condition really warranted.

Exhibit "P"

READINESS-TO-SERVE CHARGE

In determining what items of the company's expense of operation should be considered in arriving at a service charge for the Nashville Gas and Heating Company, the method of the Railroad Commission of the State of Wisconsin in the case of the Madison Gas and Electric Company, handed down in 1910, has been used. In that case the expenses of supplying gas were first divided into two classes of costs—those which bear a direct relation to the number of consumers or meters, called "Consumers Expense," being that part of the fixed costs to the company of carrying a consumer irrespective of whether gas is actually used or not, and those which vary with the number of cubic feet of gas used, called "Output Expense," representing additional costs incurred if gas is used, the amount of cost varying directly with the amount of gas consumed. Statement of these costs will be found shown in detail herewith.

It will be noted from this statement that the Nashville Gas and Heating Company conservatively estimate that they will expend during the year of from July 1, 1919, to July 1, 1920, the sum of $75,550 in maintaining the consumers' service, care of complaints, reading meters, collecting bills, etc. In addition to the above amount, in accordance with the Wisconsin decision, there has been added $35,105, representing the proportion (100%), applicable to "Consumers' Expense," of the annual interest charge in meters and services, as of June 1, 1919.

The total consumers' expense for the year of July 1, 1919, to July 1, 1920, will amount to, approximately, $110,655. We estimate that we will have in use during that period an average of 11,400 active meters, and the average Consumers' Expense for that year will be $9.71 for supplying each of these consumers, exclusive of the cost of gas, or at the rate of 81 cents per meter per month.

STATEMENT OF OUTPUT AND CONSUMERS' EXPENSE

OPERATING EXPENSE

	Year from July 1, 1919 to July 1, 1920	% of Whole	Amount	% of Whole	Amount
MANUFACTURING	$193,671.00	100	$193,671.00	100	.....
DISTRIBUTION—					
Distribution Supervision	7,244.00	50	3,622.00	50	$3,622.00
Distribution Off. Exp.	1,687.00	50	844.00	50	844.00
Service Expense	7,443.00	50	3,721.00	50	3,721.00
Consumers' Premises Expense	4,113.00	50	2,057.00	50	2,057.00
Maintenance Mains	4,520.00	67	3,028.00	33	1,492.00
Pumping Drips	281.00	67	188.00	33	97.00
Maintenance of Services	2,068.00		.....	100	2,068.00
Maintenance of Meters	5,973.00		.....	100	5,973.00
Resetting and Removing Meters	4,068.00		.....	100	4,068.00
Turn on and off Expense	1,358.00		.....	100	1,358.00
Distribution Pumping	710.00	67	476.00	33	234.00
Street Mains Abandoned	.....	67	.....	33	.....
Totals	$ 39,465.00		$ 13,936.00		$ 25,534.00
NEW BUSINESS	5,290.00	82	4,330.00	18	920.00
COMMERCIAL	28,950.00		.....	100	28,950.00
GENERAL	23,363.00	82	19,157.00	18	4,206.00
TAXES	56,928.00	72	40,988.00	28	15,940.00
Totals	$347,667.00		$272,082.00		$ 75,550.00
METERS (Interest on cost of 11,400 meters @ $10.33, $117,762.00 @ 7%	8,243.00		.....	100	$ 8,243.00
SERVICES (Interest on cost of 19,956 services @ $19.93 per service, $383,754.00	26,862.00		.....	100	$ 26,862.00
Totals	$382,772.00		$272,082.00		$110,655.00

Average number of meters that will be in service during the year, from July 1, 1919, to July 1, 1920, 11,400; $110,655.00 divided by 11,400 equals $9.71; $9.71 equals yearly expense to company in supplying each customer with service; $9.71 divided by 12 months equals 81 cents per meter per month.

Exhibit "Q"

Revenue to be derived by the company if the following rates are granted
Gas @ $1.25 Gross, $1.15 Net per M cubic feet
40c per Month Service Charge
Minimum Bill of $1.00 Per Month

357,494,000 cu. ft. @ $1.15			$411,118.10
11,400 meters @ 40c per month		$ 4,560.00	
Less 5% uncollectible		228.00	
Total monthly service charge income		$ 4,332.00	
Total yearly service charge income			51,984.00
Income minimum bills of $1.00			4,800.00
			$467,902.10
Less extra 5% paid to city			2,681.20
			$465,220.90
Operating expenses	$347,667.70		
Interest charges	144,280.00		491,947.70
Total costs	$491,947.70	LOSS	$ 26,726.80

Exhibit "R"

Revenue to be derived by the company if the following rates are granted
Gas @ $1.30 Gross, $1.20 Net Per M Cu. Ft.
30c Per Month Service Charge
Minimum Bill of $1.00 Per Month

357,494,000 cu. ft. @ $1.20			$428,992.80
11,400 meters @ 30c per month		$ 41,040.00	
Less 5% uncollectible		2,052.00	38,988.00
Minimum bills of $1.00			$ 4,800.00
			$472,780.80
Increase city 5% tax			3,574.94
Gross income			$469,205.86
Operating expenses	$347,667.70		
Interest charges	144,280.00		491,947.70
Loss			$ 22,741.84

Exhibit "S"

Revenue to be derived by the company if the following rates are granted
Gas $1.25 Gross, $1.15 Net, Service Charge 50 Cents Per Month
Minimum Bill of $1.00 Per Month

357,494,000 cu. ft. @ $1.15			$411,118.10
11,400 meters @ 50 cents per month		$ 68,400.00	
Less 5% uncollectible		3,420.00	64,980.00
Income minimum bills, $1.00			4,800.00
			$480,898.10
Less extra 5% paid to city			2,681.20
Gross income			$478,216.90
Operating expenses	$347,667.70		
Interest charges	144,280.00		
Total cost			491,947.70
Loss			$ 13,730.80

Exhibit "T"

Revenue to be derived by the company if the following rates are granted
Gas @ $1.20 Gross, $1.10 Net Per M. Cu. Ft.
Minimum Bill of $1.00 Per Month

357,494,000 cu. ft. @ $1.10		$393,243.40
12,606 meters @ 50c per month	$ 6,303.00	
Less 5% uncollectible	315.15	
Total monthly service charge income	$ 5,987.85	
Total yearly service charge income		71,854.20
Income minimum bills of $1.00		4,800.00
		$469,897.60
Less extra 5% paid to city		1,787.47
Gross income		$468,110.13
Operating expenses	$347,667.70	
Interest charges	144,280.00	
Total costs	$491,947.70	491,947.70
Loss		$ 23,837.57

Exhibit "U"

Revenue to be derived by the company if the following rates are granted
Gas @ $1.30 Gross, $1.20 Net Per M. Cu. Ft.
Service Charge 50 Cents Per Month
Minimum Bill of $1.00 Per Month

357,494,000 cu. ft. @ $1.20		$428,992.80
11,400 meters @ 50 cents per month	$ 5,700.00	
Less 5% uncollectible	285.00	
Total monthly service charge income	$ 5,415.00	
Total yearly service charge income		64,980.00
Income minimum bills of $1.00		4,800.00
		$498,772.80
Less extra 5% paid to city		3,574.94
		$495,197.86
Operating expenses	$347,667.70	
Interest charge	144,280.00	
Total costs	$491,947.70	$491,947.70
Gain		$ 3,250.16

Exhibit "V"

Revenue to be derived by the company if the following rates are granted
Gas @ $1.30 Gross, $1.20 Net Per M. Cu. Ft.
40 Cents Per Month Service Charge
Minimum Bill of $1.00 Per Month

357,494,000 cu. ft. @ $1.20		$428,992.80
11,400 meters @ 40 cents per month	$ 54,720.00	
Less 5% uncollectible	2,736.00	51,984.00
Income minimum bills of $1.00		4,800.00
		$485,776.80
Increase city 5% tax		3,574.94
		$482,201.86
Operating expenses	$347,667.70	
Interest charges	144,280.00	$491,947.70
Loss		$ 9,745.84

Exhibit "W"

Taxes of the Nashville Gas and Heating Company, Year 1918

City 5% of gross receipts	$ 23,006.45
City assessment	13,886.46
City privilege	1,000.00
State and county assessment	13,886.46
State and county privilege	2,006.00
Pennsylvania State tax	3,128.28
State and county license (coke)	81.50
Federal tax	1,460.50
Total	$ 58,455.65

It appears that North Carolina is the only Southern State that prescribes a system of yearly report, and application for rates combined, which is of such a character as to enable the Commission and their staff of experts to very readily have such data and information as would enable them to properly review all operating and financial conditions of the company, and establish or modify rates accordingly.

During the six months after our emergency rates went into effect we found that they were not working out as well as we had hoped, due entirely to continued advances in the cost of all labor, manufacturing materials, taxes, and other incidental expenses and costs; and, as a consequence, the Commission appointed Alfred E. Forstall of New York as appraiser for our properties, who, with a very competent staff of engineers, made a thorough and detailed appraisal of our properties. After this appraisal was concluded, we made application for a hearing, based upon his appraisal.

Newspapers Saw Need of Relief

It was pointed out to proprietors of daily papers that, as they had been forced, by advancing cost of materials and labor, to nearly double their subscription and advertising rates, due entirely to the same economic conditions under which we were suffering, we, too, were warranted in praying for most necessary additional relief. The publishers realized the justice and fairness of our cause, and from time to time editorials and articles appeared, suggesting that the utilities needed relief and approving of our contemplated request for increased rates.

After thoroughly arguing our case before the publishers of the various newspapers and a number of other prominent and intelligent persons, I went before the various civic clubs in the city, notably, the Rotary, Kiwanis and Lions, and presented our case and cause in detail before them in open session. However, so that they might very clearly and without tiring gather the pertinent facts entering into these increased costs, we had made up from the data already shown various large exhibits, on card board, which were strung throughout the hall and could be seen and read from any part of the auditorium.

These special exhibits were also photographed and various employees of our Company were provided with the photographic copies and made thoroughly conversant with the data shown thereon, so that they, too, might be able to intelligently discuss them with anyone who might be interested, or question our proposed application for further increased rates.

The following exhibits are of the photographic copies used as above referred to:

Presented Story Graphically

Exhibit "1" showed the price per ton of coal at mines and freight rate from the years 1912 to 1920, inclusive.

Exhibit "2" showed the average cost of coal per ton delivered in yards from 1912 to 1920, inclusive.

Exhibit "3" showed the average analyses of domestic coal and of gas coal.

These exhibits were most necessary, because of the increased cost of coal suitable for the production of gas, over the then selling price of ordinary domestic coal, and for the further reason that the average consumer does not know that there is any material difference between domestic and gas coal. These exhibits were discussed at considerable length, as the cost of coal is the primary item entering into our increased costs.

So that they might visualize in a more concrete way these comparative increased costs in coal and gas oil, as shown on financial cost statement, we presented Exhibit "4" of bituminous coal and gas oil.

Exhibit "5" showed the average cost of common labor per hour from 1912 to 1920, inclusive, with a statement showing the great number of such laborers in our employ during these periods.

Exhibit "6" covered the service charge, regarding which there had been a great deal of discussion, and unfavorable criticism, since the time it had been

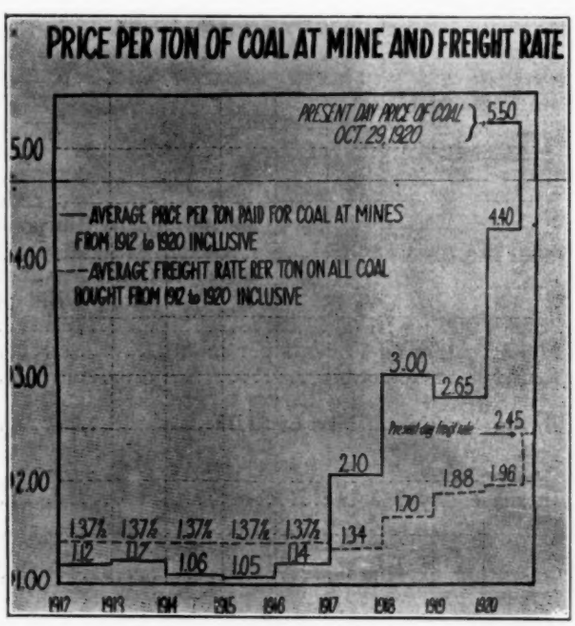


Exhibit 1

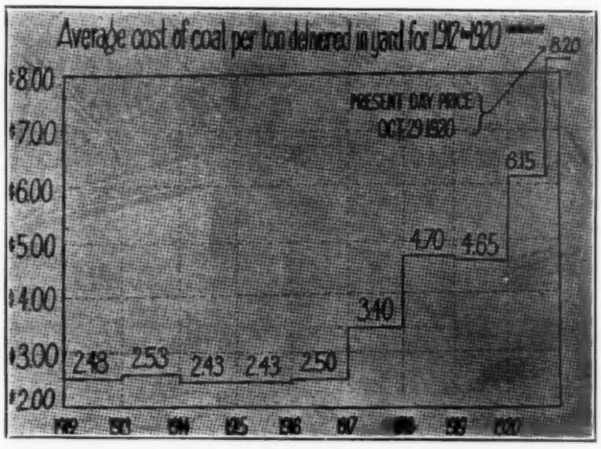


Exhibit 2

made effective, due primarily to the fact that the average consumer could not thoroughly understand it, therefore considerable time was devoted to the discussion of this charge, which showed that in October, 1920, it had risen to $12.01 per year or $1 per meter per month.

Exhibit "7" showed the increase in the cost of labor, gas coal and oil for the years 1915 to 1920 and estimate for 1921.

Exhibit "8" showed the gas sold, earnings and per cent of income on a valuation of $3,500,000 for the years 1915 to 1920, inclusive, the consumer having the privilege of drawing his own conclusions as to what the earnings might possibly be in 1921, if adequate rates were not granted.

The average consumer has never fully realized or appreciated the enormous sum that our company pays in taxes, and Exhibit "9" shows the taxes paid for the years 1915 to 1920, inclusive, with an estimate for 1921, and the amount in cents paid through taxes on each thousand feet of gas sold.

When it became rumored about the city that our company would possibly make application for further increase in rates, the various women's clubs of the city began to discuss the matter, generally in an unfavorable light. We then found that the leaders of these various women's clubs were actively affiliated with the Housewives' League of Nashville, an organization of about 800 leading women of the

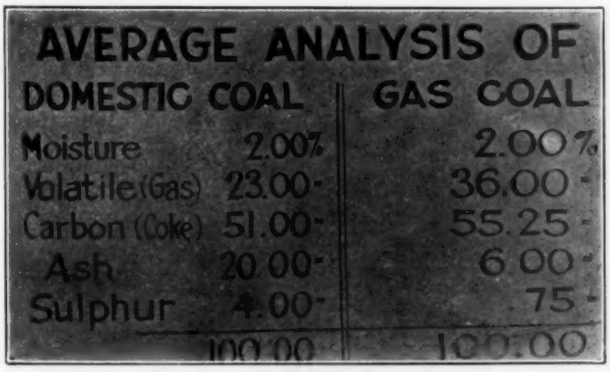


Exhibit 3

city, and the request was made that the writer come before the Housewives' League, in open session, and present our data and arguments for the contemplated request for increased rates.

With considerable trepidation, I appeared before this body of representative women, being the only man in the auditorium, but reinforced with the original exhibits just shown, and with the knowledge that our contentions were just, fair and equitable, and that such increase as we might ask for was justified.

An hour's talk was made before this body, during which time many interested ladies asked most pertinent questions. Much publicity was given to this

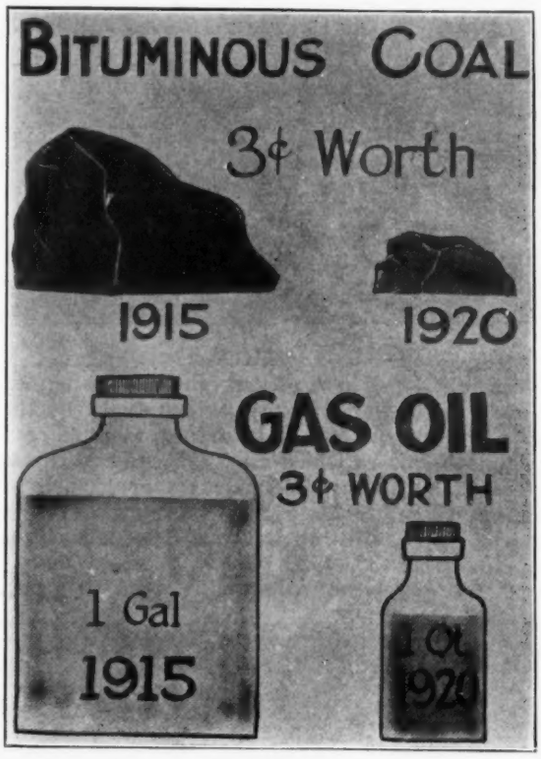


Exhibit 4

talk before and afterwards, as an invitation had also been extended through the press to all women interested, and other women's clubs in Nashville, to be present.

Secured Support of Women's Clubs

I am pleased to state, as the outcome of this meeting, that the president of the Housewives' League wrote an official letter to the chairman of the commission, stating that the members believed that the gas company was entitled to increased rates and asked that adequate increased rates be granted.

It was most gratifying, also, that a voluntary letter of the same character was written by the board of governors of the Chamber of Commerce to the chairman of the commission. All of this, I believe, was a material factor in securing for us increased rates.

A further hearing, to fix a permanent rate, was held before the Commission on October 14, 1920, extending over a period of several days, at which time

Mr. Forstall submitted his inventory and appraisal, and data similar to that herein referred to, was presented and considered. After the appraisal had been submitted, the Commission established a valuation of our properties of $2,650,000 as of April 1, 1920, allowing us a minimum rate of return of 6½ per cent and a maximum rate of 7½ per cent upon this valuation, and, in addition, ordered that we set up each month, as a renewal and replacement reserve,

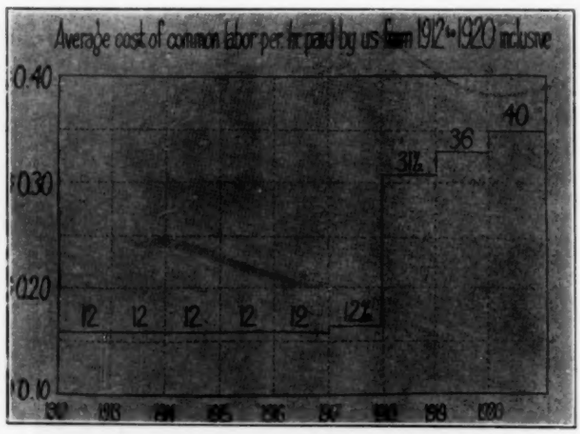


Exhibit 5

one-tenth of 1 per cent of the value of the depreciable property of the company (which averages about 6½ per cent per M) and further allowed us to amortize the losses which we had sustained through not being able to earn 6½ per cent upon the above valuation from the date the emergency rate was granted, July 1, 1919, to the final date of this hearing, November 30, 1920, which losses amount to $118,000.00, and were to be amortized over a period

SERVICE CHARGE	
DISTRIBUTION EXPENSE	$44,004.40
OFFICE & GENERAL "	$47,420.00
PROPORTION OF TAXES	$28,885.62
7% INTREST ON VALUES OF SERVICE & METERS	$32,728.17
TOTAL	$153,038.19

AVERAGE NUMBER OF METERS IN USE 12737
12737 METERS DIVIDED INTO $153,038.19 = $12.01
PER METER OR $1.00 PER METER PER MONTH

Exhibit 6

of 10 years at the rate of $1,000 per month.

Considering the above valuation, rate of return, renewal and replacement reserve, and amortization of losses, the following rates were developed and approved and made effective as of December 1, 1920:

First 15,000 cu. ft. $1.90 gross $1.80 net per M.
Next 20,000 cu. ft. 1.60 gross 1.50 net per M.
Next 25,000 cu. ft. 1.30 gross 1.20 net per M.
Over 60,000 cu. ft. 1.10 gross 1.00 net per M.

THE LARGEST ITEMS ENTERING INTO THE COST OF GAS

YEAR	LABOR	GAS COAL & OIL
1915	$68,759.26	$74,456.15
1916	71,788.90	78,645.01
1917	83,934.90	112,628.62
1918	118,717.85	186,736.36
1919	189,980.40	176,623.82
1920	188,277.39	237,823.73
1921	188,277.39	333,194.00

Exhibit 7

Service charge of 50 cents per meter per month.

I fully realize that the details, as set forth in these rate cases, are somewhat antiquated, but as actual conditions today are about the same as they were

YEAR	GAS SOLD	EARNINGS	PERCENT OF EARNINGS ON VALUATION
1915	279,340,600	90,660.71	2.59%
1916	283,965,500	92,640.62	2.93%
1917	302,258,600	62,464.54	1.78%
1918	371,632,400	65,347.96	1.87%
1919	400,148,100	89,438.44	2.56%
1920	403,982,500	56,650.06	1.62%
1921	400,000,000	?	?

Exhibit 8

when these cases were presented, and that the same data would be helpful and necessary in presenting a case now, I have shown this data, with the hope that it may, in some small way, be helpful to other operators in preparing and presenting their cases.

TAXES

YEAR		% 1000 FT. SOLD
1915	$62,417.27	22.34%
1916	59,851.33	21.08%
1917	62,345.55	20.62%
1918	49,636.07	13.35%
1919	59,925.08	14.98%
1920	91,162.93	22.56%
1921 EST.	103,162.93	26.79%

Exhibit 9

GAS SALES ASSOCIATION OF NEW ENGLAND HOLDS ANNUAL MEETING

(Continued from Page 428)

and conveniences it would add to the home and how the gas company could eliminate much of the misunderstandings caused by misrepresentation on the part of other interests, by presenting the facts, and, the greatest of all, establish the fact that in eight cases out of ten, gas should be used to heat water.

At this point Mr. Stack showed lantern slides giving the various installations that can be made with gas water heaters, which will give the best service possible. He also brought out the importance of installing heat controls at various convenient places, such as the bath room, etc. In this way, a tank water heater can be shut off without going downstairs to the boiler where the heater is connected.

You might say this is all very nice, continued Mr. Stack, but far from being possible to apply. Perhaps if each individual gas company would attempt to do it individually, it would seem almost impossible, but it does seem reasonable that gas companies could collectively acquire the proper information, and place it at the disposal of any company interested. Would this not put gas companies in a position to give information which would build generally for gas in the trade and the various interests connected with the trade and the public?

It seems reasonable to assume that perhaps organizations of this kind might be able to assist the gas companies in accomplishing something of this nature. I believe, if you will clear the channels and the avenues through which water heaters are sold, you will greatly enlarge the output of gas.

In attempting to do this, gas companies can well expect the assistance of all interests in the gas industry, because what helps one helps all.

In the course of his remarks Mr. Stack gave the following figures showing the comparative cost of heating water with coal and gas:

Comparative Cost of Heating Water With Coal and Gas from 30 Gal. to 250 Gal.

Conditions: Coal at $15 per ton equals ¾c per lb., 1 lb. equals 13,000 B. T. U., allowing 7,000 B. T. U. per lb. of coal as purchased, available to heat water. Water heated in water jacketed coal heater connected to range boiler. Coal burned at rate of 1½ lbs. per hour. Water heater 80 degrees rise (yearly average). Additional cost for labor considered when used.

Gas at $1.25 per 1,000 cu. ft. 530 B. T. U. per cu. ft. Compared under same conditions.

The figures given are the nearest practical figures without the decimals, and for all intents and purposes are practically correct and can be used accordingly.

				COST PER MONTH			
				Using Coal		Using Gas	
				Coal	Labor	Total	Gas
30 gal.	per	day	requirement using least possible amount of coal	18 lbs.	$4.05		$4.05	$2.40
60 "	"	"	—small family	36 lbs.	8.10		8.10	4.80
90 "	"	"	—requirement in average homes.	36 lbs.	8.10		8.10	7.20
120 "	"	"	for home with 2 baths, maid and man to tend fire	36 lbs.	8.10	$7.50	15.60	9.60
150 "	"	"	for large family with 2 baths and maid	36 lbs.	8.10	15.00	23.10	12.00
180 "	"	"	requirement—maids	36 lbs.	8.10	15.00	23.10	14.40
210 "	"	"	" —cook	36 lbs.	8.10	15.00	23.10	16.80
240 "	"	"	" —butler	36 lbs.	8.10	15.00	23.10	19.20
270 "	"	"	" —chore-man	36 lbs.	8.10	15.00	23.10	21.60
290 "	"	"	" —chore-man	36 lbs.	8.10	15.00	23.10	23.20

COAL			GAS		
Gals. Per Day	Gals. Per 1c	Efficiency	Gals. Per Day	Gals. Per 1c	Efficiency
30	2 2/10	9%	30	3¾	60%
60	2 2/10	9	60	3¾	60
90	2 3/10	12	90	3¾	60
120	2 3/10	14	120	3¾	60
150	2 4/10	20	150	3¾	60
180	2 6/10	25	180	3¾	60
210	2 7/10	29	210	3¾	60
240	3 1/10	33	240	3¾	60
270	3½	37	270	3¾	60
290	3¾	40	290	3¾	60

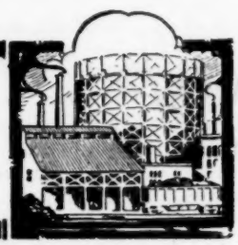
Dishwashing and Like Requirements

A Gas Tank Heater will heat 3 gals. of water to a temperature of 140 degrees in 6 min. at a cost of ¾ of 1c.

Baths

A Gas Tank Heater will heat water for a bath to a temperature of 110 degrees at the rate of 1 gal. per min., 20 gals. in 20 min. Cost, 6 gals. for 1c, 20 gals. for 3¼c.

NEWS OF THE GAS INDUSTRY



Hopkins to Teach Gas Engineering

Baltimore, Md.—Courses in gas engineering will be established in the Johns Hopkins University Engineering School beginning next October, it was announced recently at Homewood.

Provision for the new department has been made through an endowment fund established by gas industries and public service corporations in sixteen Southern states, the subscriptions having been made through the Southern Gas Association.

This fund provides for a chair in gas engineering carrying an annuity of $6,000 for five years.

Johns Hopkins University will be the first engineering school in the East to offer a complete course in gas engineering, Dr. John B. Whitehead, dean of the school, said.

"For some time," Dr. Whitehead said, "the association has recognized that the rapid growth and expansion of the gas industry has caused an increasing demand for young engineers trained in the field of gas usage and manufacture. Johns Hopkins was selected as the school in which the new course should be located largely because of the gas research laboratory already established here."

"The principal purpose of the new course," Dr. Whitehead said, "will be to train graduate students, and it is hoped that young men who already have attended college and have spent one or two years in the gas industry will be attracted to the new courses for two years in advanced instruction.

"A 4-year undergraduate course also will be offered. It is expected the laboratory work will include observation and study in the plant in and near Baltimore. The Gas and Electric Company will co-operate."

Plans are under way, Dr. Whitehead announced, for the establishing of a new course in "liberal arts" for prospective student engineers. This course will enable a student to obtain a degree of bachelor of arts in three or four years, and to secure the degree of bachelor of engineering two years later.

Gas Company Employee Receives Award for Public Service

An anonymous donor has, through the "Baltimore Sun," offered an annual prize of $50 to be awarded each year to the employee of the Consolidated Gas, Electric Light and Power Co. of Baltimore, Md., who renders the most meritorious public service. The same donor has also provided awards for the Police Department, the Fire Department and the United Railways of this city.

"Joseph P. Doyle, inspector of the gas distribution department of the Gas and Electric Company, was chosen for this year's award for the intelligence, promptness and courage with which he responded to a distress call from the home of George Reuse, 1201 Wilcox Street. He saved the family of five from possible death from escaping gas and he had the dangerous leak in the street main repaired with all possible speed."

Mr. Doyle entered the employ of the company in 1911 as helper in the fitting department. Shortly afterwards, he was made fitter, then complaint man, meter man, emergency man, and inspector. Mr. Doyle enlisted in the Army at the beginning of the World War, and saw active service in France. He is considered an expert in the handling of the pulmotor and other resuscitating devices used by the company. The manner in which he performed his duties in the Reuse case is characteristic of him.

Issues a Denial

William Randolph Hearst told the American Gas Association May 7 that he had no interest directly or indirectly in a string of Kansas natural gas properties reported to have been purchased for the Hearst interests by Philip Francis, editorial writer on the staff of the "New York American."

A recent news dispatch from Topeka, Kansas, stated that Mr. Francis had appeared before the Kansas Public Utilities Commission as a representative of Mr. Hearst and had announced that the control of the Union Public Service Company, which owns the gas distributing plants in more than twenty cities and towns in Eastern and Southern Kansas, had been taken over by the Hearst interests.

Empire Company Buys Site for Gas Holder

The Empire Gas and Electric Company has just acquired the Higgins and Shelansky properties in Wadsworth Street, where a new gas holder of 500,000 cubic feet capacity and a new storehouse of hollow tile and stucco will be erected. The holder will be 98 feet in diameter and 100 feet high. The storehouse will be built on the site of the present holder, which will be torn down. Approximately $150,000 will be expended in the work.